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The new Italian Ministry brought in a bill April 8, arranging provisionally for the working of the railroads by the State. The leases to the three great operating companies expire June 30, and the government, which owns the railroads, had been unable to agree with the companies on terms for a renewal of the leases. Last February the Giolitti Ministry, which was in power at the time of the negotiations, brought in a bill providing for the administration under the State, including the conditions of service of the employees, who are to be taken over from the companies into the State service. These fixed rates of pay, hours of service, rights to promotion, pensions, etc., very much as they are with the companies, they having been readjusted not long ago by the intervention of the State. The bill also prohibited strikes on the part of the employees, and provided punishments for refusal to serve. The employees threatened to strike if this bill should be seriously pressed; but meanwhile the Prime Minister, Giolitti, who was seriously ill, resigned, and the cabinet was reorganized, with Carlo Ferraris, Professor of Statistics at the University of Padua, as Minister of Public Works. The bill brought in by this new ministry contained substantially the provisions of the Giolitti bill, so far as employees are concerned; and the strike reported early in April was intended to prevent, if possible, the passage of the bill, which was held objectionable because of insufficient provision for wages, etc., and especially because of the prohibition of strikes. The movement was condemned, however, even by representatives of the Socialist party, and though traffic was greatly disturbed for a time, the strike was over in five days after it was declared. Its instigators, when its failure was already evident, pretended to be satisfied by a declaration of the Prime Minister that he would not oppose an amendment to the bill providing for a board of arbitration in which the em-

ployees should be represented and that the strikers would be mercifully dealt with if they returned to work. The bill of the Ministry passed by a very large majority. The unpopularity of the strike was doubtless largely due to the fact that the claims of the employees had received careful consideration by the government quite recently, and their condition had been improved as far as was thought practicable in the present economic condition of the country; and the prohibition of strikes in a corps of State employees, permanently engaged, seemed as reasonable as in the army or the police.

The Cudworth collision, recently reported on by the Board of Trade,* affords the best possible illustration of the difficulties which are caused by fog on any railroad where fast trains are frequent, and where general traffic is heavy, requiring a large number of signals. The collision also illustrates other features of train running, already familiar to American railroad officers, such as the tendency even of some experienced enginemen to trust to their firemen unless watched, and to assume that a fireman has seen a given signal without requiring him to distinctly say that he has seen it. We also see the disadvantage of fixing signals at the left of the track. Englishmen have got along with this arrangement all their lives, but it is a disadvantage all the same. Again, the case shows the futility of depending for the safety of trains on a rule (like that requiring tower men to go down and put torpedoes on the rail) which necessitates careful reasoning and weighing of circumstances by the tower man. "A rule which cannot be enforced [with reasonable facility] should not exist." But the complexities of "fogging" make up the larger part of Major Pringle's discussion. One needs but to read over his account of the successive losses of time by

*See General News Section p. 178.

different men, aggregating more than two hours, to reach the conclusion that such protection can be satisfactorily managed only by an elaborate system; a system as carefully designed as one for the construction of boilers or the inspection of bridges, and entrusted to as high a grade of men as is employed on boilers and bridges. An engineman is, indeed, bound to assume the absence of fogmen until he has evidence of their presence; but this is a very hard rule to enforce. If a runner finds fogmen at six stations will he not be very liable to assume that they are on hand at the seventh? One who does not so assume is probably a man of extra quality. Moreover, if fogmen are on duty, we still have the difficulty, as with automatic audible signals, that the absence of sound is what indicates all-right. Really, as shown by Major Pringle, the actual dependence must be on a positive proceed signal—on the fogman's hand lamp or his voice. But the lamp is little better than the fixed signal lamp. It has the advantage of being movable, but the disadvantage of being in the hands of a man who is too movable, and whose mental training is such that his mind may also be wobbly in critical situations. Dependence on the fogman's voice is a very unscientific arrangement, obviously; albeit such voices have undoubtedly safeguarded many thousands of trains, carrying millions of passengers. The difficulties with any automatic audible signal are fully recognized by Major Pringle, and have been well discussed before now. Until these are settled we can only fall back, as in the Clifton (Pa.) case last March, and the Westfield and Fourth Avenue tunnel cases farther back, on improved discipline of enginemen. And what fault can we find with the reasoning of those who say that this is the one best remedy, and that all efforts should be concentrated in this direction? For the up-mail, immediately preceding Engineman Mugg, had a runner who succeeded perfectly in sighting the visual signals, in spite of the dense fog.

AMERICAN AND EUROPEAN RAILROADS

Representatives of the railroads of the chief European countries have this month had an opportunity, many of them for the first time, to observe for themselves American railroad construction and practice, and if they have gone away from the main routes and over lines which serve thinly peopled districts, they doubtless have been struck by what they may call the crude construction and appliances which are made to serve, but which are very much more elaborate than the original railroads from which our most important lines have been developed. Could we bring before our eyes the railroads and rolling stock and methods of working which the Austrian engineer, Chevalier von Gerstner, studied in America in 1838, and described minutely in volumes now too little known, we should ourselves have a better idea of the causes which have made our railroads what they are. He then found that most lines had cost from \$10,000 to \$20,000 per mile, and yet were of immense service in developing the resources of the country, in many parts unavailable without some artificial transportation routes.

Now the first thing to strike the student of

railroads in America is the enormous extent of the system, which exceeds 212,000 miles, against a total in Europe of about 190,000. But what is less likely to be appreciated is the fact that the population of the United States is now about 83,500,000, while that of Europe is 400,000,000. The fact that a mile of railroad serves and is supported by 390 people in this country and by 2,100 in Europe should never be lost sight of in making comparisons; and as comparisons will be made, not with all Europe, but with its separate countries, we shall note that per mile of railroad there are numbers of inhabitants, as follows:

France.....	1,400	Great Britain...	1,875
Belgium.....	1,626	Austria-Hungary	1,987
Germany.....	1,694	Russia.....	3,577

How has it been possible to provide more than five times as much railroad here as in Europe for the same population?

First, by the very extent of the country, affording natural produce, such as ores and timber, as well as farm produce, weighty in proportion to the number engaged in production, a very large part of which can find consumers only after carriage for a long distance. Unlike Europe, this country has grown up chiefly since the introduction of railroad transportation; and it has not been necessary here, as it was there originally, for the population of a very limited district to have all its chief wants supplied from its immediate vicinity. Dakota could grow up while marketing its crops, almost the sole product of its industry, 2,000 miles away on the seaboard, or 3,000 miles further in Europe, while getting clothing, hardware, etc., from places equally distant, and a large part of its building material, and even fuel, from forests or mines hundreds of miles away.

The second cause of this great railroad mileage has been the cheapness of its construction—another fact always to be borne in mind when making comparisons, and almost always misrepresented, as it was before the International Convention, by including not only the capital represented by the railroads and their equipment, but also that which the railroad companies have invested in each other's securities. Now, by the report of the Interstate Commerce Commission the railroad companies of the country own about 29 per cent. of all the shares and 9½ per cent. of all the bonds of the railroads—nearly all for purposes of control or convenience in financing. The company which owns securities of another company has to issue its own securities to pay for them, and such issues yield no other return than the dividends or interest on the securities purchased. When we deduct these holdings we find that on June 30, 1903, the averages per mile of the railroads of this country were \$21,222 of stock and \$23,411 of bonds. There is besides this, however, an unfunded debt, averaging \$4,211 per mile of road, which is in part counterbalanced by current assets (as supplies on hand), but not wholly. Including this, we have a total of \$48,744 per mile of road, and this represents the whole amount on which interest must be earned. Now, the latest available statistics show the capital per mile of railroad for the whole of Europe to have been \$112,195, and in the chief countries—\$257,816 in Great Britain, \$155,838 in Belgium, \$107,248 in Austria, \$94,148 in Hungary, \$121,846 in France, \$108,213 in Italy, \$100,088 in Germany, and \$74,507 in Russia.

Only in countries where light railroads prevail, as Finland, Norway and Denmark, is the capital per mile lower than the average in this country, which average, it must be remembered, includes some of the costliest and most heavily equipped railroad in the world, as well as a great mileage of cheap railroad. The people of this country are served by a railroad system which represents a capital of about \$141 per inhabitant. In Europe, as a whole, the railroad capital is about \$47 per inhabitant—in Great Britain, \$135; in France, \$83; in Germany, \$58; in Belgium, \$56; in Russia, \$24; in Italy, \$34.

Cheap as our railroads are, therefore, we find that the average railroad capital per inhabitant is greater here than in Great Britain now, and three times as great as in Europe as a whole—more than one-fourth of whose population is in Russia, with its railroad system only fairly begun. This is, of course, the result of the large mileage here in proportion to population.

Are these cheap railroads efficient? The *Railroad Gazette* showed (May 25, 1900) that in 1898 the railroads of the United States had a freight traffic amounting to 114,078 millions of ton-miles, against about 83,000 millions for all Europe. In the year to June 30, 1903, this traffic had increased to 173,221 millions of ton-miles here, an increase of more than 50 per cent. in five years. We cannot now give the movement in all Europe for 1903, but in the German Empire it was 25,296 millions of ton-miles and 20.3 per cent. more than in 1898. Germany, with its important coal mines and iron manufactures, has been growing faster than any other great European country; but if we give the same rate of growth for all European traffic, we have just about 100,000 millions of ton-miles for the total in 1903, against 173,000 millions here, which is equivalent to a movement over the entire mileage each way daily of 721 tons in Europe, and 1,154 in the United States.

As freight carriers, therefore, our cheap railroads have done 60 per cent. more work per mile than the dear European ones. They have, of course, had a much lighter passenger traffic, the 81 millions of people here (in 1903) traveling less than the 399 millions in Europe; but here in 1903 there was travel amounting to 259 miles per inhabitant, which is greater probably than in any European country, unless it may be England, for which there are no statistics, while in the German Empire the travel per inhabitant was 234 miles. This does not take into account the very great amount of travel on electric railroads here, a travel which is many times greater than anything of the kind in Europe.

The enormous development of freight traffic in this country has been made possible only by very low rates for long distances. Cheap railroads and cheap working were indispensable if the interior was to be made productive to the extent to which it has been. Costlier railroads and a larger force to work them doubtless might have materially reduced the number of accidents, but they would have compelled a slower growth of the country. The motives for opening very imperfect lines in new country have influenced not only those who sought to make a profit on the railroads, but also, and to a much greater extent, those who desired to make gains from what was previously a wilderness.

AIR-BRAKE PRACTICE WITH FREIGHT TRAINS.

The Coroner's Jury that investigated the explosion by which 23 persons were killed near Harrisburg, Pa., on May 11, expressed the hope that "the terrible results of this accident and the frequency with which similar accidents have been occurring throughout the country, will lead the proper authorities to a careful investigation as to the proper method of regulating brakes on freight cars." As to the proper method with cars containing explosives, railroad men are probably pretty well agreed: that the train should be air-braked throughout its whole length, and should be short enough to reduce the aggregate slack between the cars to an amount which would not cause a dangerously violent shock to explosives properly packed, in case of an emergency application of the brakes. It is reasonable to add to these considerations a proviso that the speed shall be moderate enough to obviate the likelihood of having to apply air brakes suddenly with full force.

When the jurymen speak of "similar accidents throughout the country," they are broadening their inquiry far beyond the question of explosions; for these "similar accidents" occur under circumstances which might be predicted almost with certainty; circumstances such that no discreet superintendent would put powder cars in trains subject to them. A long train only half air-braked, with cars of varied ages and types, and running over undulating grades, is so liable to violent shocks and to derailment, in case of the rupture of an air-hose or an emergency application of the brakes, that a percentage of damage and loss is almost a certainty. Only perfect hose and other brake apparatus, and infallible men, could give assurance of freedom from this danger. With cars all fitted with efficient friction buffers the present dangers from slack would undoubtedly be so reduced as to be within control, and, as Mr. Westinghouse has said, our troubles would be curable; but the immediate problem is how to deal with the million cars that have not friction buffers, and which do have a considerable percentage of unsatisfactory spring buffers.

The question is, can anything be done beyond what every intelligent and careful manager is already striving to do? To equip all cars with air-brakes as soon as possible, to use all in every train that are equipped, to keep couplers, draft gear, brakes and hose in the best possible condition, to train every engineman to use the air with skill—all these are generally agreed to be universal duties. What more is it possible to do? The use of a separate brake (straight air) on the engine and tender is a great help in regulating the slack in a long train, and slack is what makes the trouble; but the separate brake does not provide against the danger that results from the break-in-two of a train. Non-air cars cannot be put in separate trains and run by themselves, with special precautions, for the law requires the use of power brakes on 50 per cent. of the cars in every train.

Even if the law did not impose this requirement, it does not seem very likely that any better results could be accomplished. If only 10 or 20 per cent. of the cars in a train were air-braked a careless engineman would have

less power to make a sudden stop, and thereby bunch up a long string of non-air cars; and an accidental full application on 10 cars would not bunch up a long train so badly as one on 30 cars would. But the fewer the number of cars braked, the less is the power for stopping in case of danger ahead, and the greater the liability of violating the statutory requirement that the engineman shall be able to control the speed of the train. The less control in the power of the engineman the lower must be the speed of trains, and lower speed means lost time. The cost of lost time might not be greater than the cost of accidents if trains were run faster; no one can tell; but it would be a constantly accumulating loss.

Who could draw the line which should fix a percentage of air-cars small enough not to bunch up the cars behind them in case of accident, yet large enough to give adequate control of speed in every-day working? Assuming that it could be done in some cases, the question would have to be left largely to the judgment of yardmasters, enginemans and conductors, and such scattering of authority would introduce a new element of danger. Nearly every freight train nowadays has air brakes on more than 70 per cent. of its cars. To habitually leave more than half of these out of service would demoralize the maintenance and inspection department.

On the whole, the lessons of experience do not seem to point to any better or safer course than that already approved by general practice; to have as many air brakes as possible; to keep them in the best condition possible, and to use them as much as possible.

RECORD DISCIPLINE ON THE NEW HAVEN.

The New York, New Haven & Hartford is the first large road to abolish suspensions since 1897 (except for the action taken by the Illinois Central in 1903). The fact that so many roads have adopted Brown's discipline and have kept it in force for eight or ten years is conclusive evidence that the plan is well adapted to the railroad service, if not that it is the best plan known, for the purpose for which it is designed; and yet, on the other hand, the course of large and important roads in continuing to ignore a scheme which has been so warmly praised raises the question whether "record discipline," as it is called—punishing by threats instead of by blows—does not lack important needed elements.

The railroad manager who does not abolish suspensions feels no call to give any reason for his inaction, except that his discipline is satisfactory, as it is, both to employer and to employee; but the action of those companies which changed their methods in 1887-1897 hardly warrants the inference that the discipline of a railroad needs to get to be decidedly bad before its manager ought to adopt the Brown system; and therefore the question of the merits of the system may be worth a moment's consideration. Discipline may be good, and yet be susceptible to improvement. It is easy for a manager to assume that certain employees are satisfied with his method of discipline when they are only quieted, and also easy for an employee to be satisfied with a rule which imposes sus-

pension for misconduct, for the reason that he does not know of a better rule; does not rightly estimate the relative values of a plan with which he is acquainted and one of which he is ignorant.

Much of the talk about discipline is based on views which are inexact, not to say grossly distorted. One superintendent says that he will not "pile up demerits" against employees who make mistakes, because the floaters who resign after a year or two will not suffer, while the permanent men—the best in the force—will be the ones who will have to submit to all the hardship. But neither Mr. Brown nor his system will do anything to hinder the superintendent from clearing those permanent men's records every year if he sees fit to do so. If "discipline by record" will not make them better men—so that the employer can afford to wipe out their demerit marks—is there any evidence that suspension would improve them? Another superintendent insists that punishment must be of a kind that the culprit will feel. But which would naturally be felt the most sharply, the loss of \$100 now, or the prospect of the loss of one's job a few months or years in the future? If demerit marks will not serve to impress an employee with such a prospect, when it is desired to so impress him, the fault must lie with the employing officer. One objector says that it will never do to announce beforehand by graduated schedule just what quantity or amount of "record punishment" is to be inflicted for given offences. Nobody advocates any such course. Another thinks that the difficulty of discovering, appraising and fairly conferring "merits" (recognition of conspicuous good behavior) is a serious fault of the Brown system. Well, suppose it is; clearing men's records, where they deserve it, will take the place of all that. A simple letter, assuring a man that his everyday duties have been well done for the past year is worth more than the granting of a gilt ribbon for stopping a runaway car, or for doing something that no man has the slightest opportunity of doing more than once in forty years. Conferring "merits," however, is practicable with or without suspensions; we are wandering from our subject. There are numerous points of likeness between Brown's discipline and the other kind; the question that we have now to consider is that of the differences between them.

And the great difference between the two is that with Brown's plan the men are not kept idle, losing their time, and the company does not have to keep an unduly large extra list. It is true that record discipline is best appreciated where suspensions have been numerous, and where the list of extra men, earning what they can get and always living on uncertainties, has been large. But the benefit to the suspended men is just as marked if there are only two of them in a year. The New Haven road names as an expected benefit the prevention of suffering among the members of suspended men's families. Suffering is a pretty severe word. If actual material suffering is a common result of suspensions, the humane superintendent would do better to discharge the employee irreversibly, and thus set him to hunting for another job without delay. Mental suffering is, of course, inevitable and may well be as great with record discipline as with actual suspension, if not greater. But even without

suffering—if there be nothing worse than sore inconvenience—the superintendent who has to listen to the story of that inconvenience and hardship from the lips of the wives and other dependents of suspended men should naturally be glad to do away with suspensions.

The argument that the newer and rougher men in the freight and yard service are not endowed with enough sense and foresight to appreciate a punishment that may not actually affect them in a material way until after a year or two, is in part refuted by the success of the Brown system on the Metropolitan Street Railway in New York; for that company has many new men and, by reason of its location and other circumstances, must have a considerable percentage of men whose refinement is not of the highest type. And if trainmen are boorish and unreasoning, why should not they be supplanted, in any event by better ones? Officers of the Long Island and other standard railroads have also given testimony to the success of the Brown system with men supposed to lack those mental qualities which make them amenable to refined methods of discipline. Moreover, it would be possible to abolish suspensions in some branches of the service while continuing them in other branches. No manager thinks of suspending his private secretary; why not extend that principle a bit, at a venture? The Illinois Central rules provide for suspension of men who have been with the company less than two years, while applying "record" discipline to older ones.

If the reader thinks that the foregoing paragraphs ought to be classed as a plea rather than a judicial review, we reply that judicial consideration of the subject is somewhat difficult because the roads which object to the Brown system do not formulate any argument worthy of the name. And our position might perhaps be objected to as academic as well as one-sided; but if we have theorized and dogmatized instead of citing facts, it is because the facts of experience seem in so many cases to have been already rejected. This rejection is perhaps partly excusable, for some of those who have adopted Brown's discipline have neglected to avail themselves of its full advantages and have taken no pains to recommend it to others.

But, whatever the quality of the experience available for the instruction of those who would be instructed, Mr. Brown's scheme of discipline justifies itself by simple logic. A suspension is a barbarism. Discipline means the process of making good trainmen out of poor ones, and a "lay-off" of 10, 20 or 30 days has only the most indirect and crude connection with this process. The connection is, in fact, so indirect and useless that usually a suspension does more harm than good, aside from the harm arising from loss of wages and from the inconvenience and danger caused by putting new or less experienced men in the places of men suspended. The normal way to discipline men is to talk to them, get them to read; to answer their questions, induce them to study the work of their best qualified fellow-workers. A suspension merely gives the man the opportunity to do these things without any definite incentive or the guidance of his superior. By what reasoning can the fair-minded trainmaster, devoted to his company's interest, thus justify himself in neglecting a plain duty? Unless a man is bad enough to be discharged,

the correction of the mental or moral habit or condition which has caused a lapse, is the first duty of the trainmaster or officer in charge. Is there any other duty connected with the lapse? It is hard to see any.

There ought to be a conference of officers of roads which use "record discipline," with a view to systematizing the regulations for recording "merits" as offsets to demerits. This granting of merits is an essential feature, at least on large roads; and failure to manage it with care, intelligence and fairness may easily prove a serious detriment to the men and to the company. The discussions of the Brown system at Denver in 1900 (*Railroad Gazette*, page 845), and at New York in 1902 (page 912) abundantly show the marked and unquestioned benefits which had accrued to the roads which had adopted it; and these benefits are largely of a kind which would be equally likely to be experienced on any road abolishing suspensions, regardless of the quality of its discipline before making the change. The favorable views expressed in our editorial columns on those occasions have only been further confirmed since.

NEW PUBLICATIONS.

Modern Iron Foundry Practice. Part II. By G. R. Bale. The Technical Publishing Company, Limited, Manchester, New York: D. Van Nostrand Co. and the Derby-Collard Co., Cloth, 5 in. x 7 in., 189 pages. Price, 3s. 6d.

This is an English publication, but it contains descriptions of some of the best modern American practice. The first chapter, which embraces upwards of 92 pages, is devoted to moulding machines and machine moulding. A more or less academic discussion is given in the first part; in the latter part various types of moulding machines and their appliances are described in detail. The second chapter describes different methods used for cleaning castings, special attention being given to the sand blast method. The third chapter contains a brief discussion on the shrinkage and distortion of castings. The fourth chapter contains 65 pages and describes methods used for the physical testing of castings. The fifth and last chapter deals with foundry accounting, and in it are shown several forms of cast-blanks from which some good ideas can be obtained. The volume should be of especial value to those who are about to take up machine moulding, as the discussion on this subject is good and is clearly written. The book is illustrated throughout.

The Manual of Statistics, 1905. 1,040 pages, 5 x 8; 17 maps. Published by The Manual of Statistics Company, 25 West Broadway, New York. Cloth \$5.

The present volume constitutes the twenty-seventh annual issue. It is similar in size and appearance to the Manuals of the last few years and is devoted to condensed information about railroad securities, industrial and government securities, stock exchange quotations, mining, grain and provisions, cotton, money, and bank and trust companies. Much information is gathered together in the Manual in small space, and the record of prices on securities in the stock markets in New York and elsewhere, through a series of three years, high and low, is of great convenience. A table of comparative freight traffic and rates of the principal railroad systems of the United States is printed at the end of the railroad department, as in previous volumes, and condenses into two pages much that is of use. There are also statistics of railroad construction, foreclos-

ure sales, receiverships, etc., taken from different authorities. Without undertaking to furnish information of a very studious character the book is a pretty complete record of the kinds of facts most wanted on Wall street, and wanted quickly.

TRADE CATALOGUES.

Railroad Gardening is the title of the handsome eight-page leaflet issued by the General Passenger Agent of the Boston & Albany containing a reprint of an article on the company's beautified stations, written by F. A. Arnold for *Suburban Life*. The enterprise of the Boston & Albany in planting trees and shrubs around its stations, beautifying grounds and getting rid of all unsightly surroundings, has long been known, and has been well set forth in the columns of the *Railroad Gazette*; but the present pamphlet is a thing of beauty and deserves notice on its own account. The gardeners of the Boston & Albany have always given chief attention to perennial trees and shrubs, thus making their decorations of the most permanent character while at the same time the station grounds constitute their best nurseries. Of the 15 views shown, every one is a gem.

Railroad Appliances.—A handsomely illustrated booklet bearing the title "The Westinghouse Companies in the Railway and Industrial Fields," is being distributed by the Westinghouse Companies. It contains an excellent full page photograph of Geo. Westinghouse, and describes a number of devices and machines made by the following Westinghouse Companies: The Westinghouse Air-Brake Co., the Union Switch & Signal Co., Westinghouse Electric & Mfg. Co., the Westinghouse Machine Co., Westinghouse-Church-Kerr & Co., Cooper-Hewitt Electric Co., Sawyer-Man Electric Co., R. D. Nuttall & Co., Nerst Lamp Co., Pittsburg Meter Co., and The Canadian Westinghouse Co., Ltd.

Iron and Steel Sheet and Tin Plate.—The American Sheet & Tin Plate Company, Pittsburgh, Pa., sends a very neat leather-bound reference book containing 138 2 1/2-in. x 4 1/2-in. pages. It contains information and tables pertaining to the iron and steel and tin and terne plate products of this company. It is illustrated throughout, and the last 20 pages of the book is devoted to tables and useful information such as: How to measure roofing and siding; how to construct a tin roof; specific gravities and weights of metals; fusibility of metals; snow and wind load, etc.

Compressed Air.—The May issue of the Rand Drill Co.'s monthly bearing the title is received. It contains a number of very interesting articles pertaining to compressed air, including a detailed description and illustrations of the McGrath pneumatic turn-table motor.

CONTRIBUTIONS

The Application of Dry Air Blast.

London, May 17, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have to-day received a cable from Mr. Gayley calling attention to a misprint that had escaped detection in the proof copies of his paper on "The Application of Dry-Air Blast" circulated at the recent meeting of the Iron and Steel Institute. As these figures have been reproduced in your journal I should be much obliged if you would place the correction on record. The average coke

consumption of No. 1 furnace, January 1st to 10th, dry blast, which was given as 2,078 lbs. should read 1,825 lbs.

BENNETT H. BROUH,
Secretary, The Iron and Steel Institute.

The Svea Caloric Engine.

New York, May 1, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The cold water poured out on my engine by Mr. Reeve in his communication published in your issue of April 14, has just been noticed. It is the old antediluvian story, which periodically appears, whenever a new idea is born. I can, however, assure Mr. Reeve that I was too sure of my ground to let any possible unfavorable criticism deter me from publishing some of the details of the Svea engine. Having been the consulting engineer to the Ericsson Coast Defence Co. for a number of years, it has been my privilege to come in contact with many of Ericsson's old friends, and thereby gain a knowledge of the opposition, which he experienced, when he proposed to use air as the medium, by which heat was to be converted into power. Mr. Reeve's argument that the expansive force of air cannot overcome the friction was then used with great force, and Ericsson had great opposition to contend with, until he got his engine running. To try to disprove the same objection at this time, with more than 30,000 hot air engines running in this country alone, would be out of place.

The fact that I am using air under a pressure of 10 kg. per sq. cm. for the 100 h.p. engine, which I now have under way, thereby giving me the same pressure as in the gas engine, will also satisfy Mr. Reeve's second objection. Let us suppose that the hot air engine is an actual fact, and that a 1 h.p. engine makes 75 revolutions per minute. Let us also suppose that a heater of reasonable size could be constructed, which would supply heated air fast enough to allow a double acting engine to run 750 revolutions per minute. That would give the same engine 20 h.p.

This is exactly what I accomplish in the Svea engine. My system of rapidly heating large volumes of air places me in a position to furnish all the necessary heated air for the largest power, without undue increase in size or weight. My experience in designing both steam and gas engines will certainly assist me in properly working out all the details. They are not as formidable as those which confronted the gas engine pioneers.

Air is the poorest conductor for heat known, but the hot combustion gases will rapidly give off the heat to the surrounding water when passing through the boiler tubes. This process can be reversed with equally satisfactory results. Cold air passing through the same tubes with the same velocity will absorb the heat radiated from the heated tubes with the same rapidity. It is this principle on which the operation of my engine is based.

G. EMIL HESSE.

[As pointed out by Prof. Reeve, the hot air engine has been an attractive subject to inventors for many years owing to the high theoretical efficiency which can be obtained. Air, however, is low in "mutivity" or heat carrying power, and it is, therefore, necessary to employ very high pressures in order to develop a brake horse power without exceeding practical limits as to size and weight. In hot air engines of the type under discussion, the cold air is drawn in by one cylinder at atmospheric pressure and is then forced out, under pressure, into a heater which adds energy, in the form of heat, to the air. From the heater the air then passes into another cylinder, where it does useful

work and is expanded down to near the original atmospheric pressure. There is nothing fallacious whatsoever in this process. It is evident, however, that the amount of work available at the fly-wheel is represented only by the mechanical equivalent of the heat added to the air in the heater minus that lost in friction. Part of the work done in the second or expansion cylinder is taken up by the first, or compression, cylinder in compressing the air up to the desired initial pressure. It therefore follows that from these considerations alone it requires, for a given cylinder power, much greater cylinder volume, in the case of the Svea engine, than that required by an explosion engine working at the same initial pressure. The volume and weight of the heater should also be considered in comparing the two types of engines. An account of the largest hot air engine ever built, which was a total failure, will be found in "Church's Life of Ericsson."

—EDITOR.]

Atlantic City Speeds.

New York, May 17, 1905.

To THE EDITOR OF THE RAILROAD GAZETTE:
I do not think the *Railroad Gazette* has recorded any faster run from Camden to Atlantic City than 44½ minutes for the 55½ miles. I believe, however, that the run was done last summer with a four-car train in about 43½ minutes. But on Sunday, May 14, I had the good fortune to see this record a good deal lowered, and I think a short account will be of interest to readers of the *Railroad Gazette* even outside the boundaries of the United States. It is pretty safe to say—and it is interesting to say it just as the Schenectady trials have taught us that the steam locomotive is definitely outclassed—that no locomotive has ever yet run so fast for so long a distance. The run came about owing to my saying to Mr. Voorhees at Washington that I was sorry that Atlantic City had not been included in the Railway Congress programme. "You come, we'll run," was in effect the prompt reply. So we came, a party of five in all, including two motive power superintendents, one English and one French.

We left Camden in one of the ordinary trains of five cars, three day coaches, one combination car, and one Pullman, with seating capacity for 360 persons (90 x 3 + 60 + 30), total weight 230 short tons. The time on the down journey, start to stop, was 44 min. 20 sec. The fastest mile was 39½ sec. Two things struck me as most remarkable. Within about two miles from the start we were going at 60 m.p.h. Between the fifty-fourth and fifty-third mile post (they count from Atlantic City) our time was 56 sec. Secondly, for the first 16 miles there is an almost continuous rise, which for 2½ miles is as steep as 37 ft. to the mile. Yet on this grade we timed miles done in 50½, 49½, 45½, 48, 48, 51 seconds, and so on. When we got to Atlantic City we learned that the engineer was much disappointed; he had meant to run fast, but his engine had failed to steam freely. On the return journey, however, the engine did its duty, and we covered the distance in 42 min. 33 sec. We ran for some time at and over 90 m.p.h. One mile, if the record can be trusted, was done in 37 seconds, certainly in not more than 38 seconds. Unfortunately we were not expecting any exceptional performance and a continuous record mile by mile was not taken with the same minute care as on the outward journey. But the total time can be entirely relied on. Both ways the train ran with perfect steadiness.

Two things to my mind are even more striking than the speed of this special run, phenomenal though that was. The first is

that the regular schedule time, week in, week out, all the year round, is only 49 minutes, and this schedule is kept with monotony punctuality. And the second is that, after eight years' experience, Atlantic City speeds stand alone, not merely unequalled but unapproached. Why no other railroad company, either in America or in Europe, has set to work to boom some other pleasure resort in the manner in which the Philadelphia & Reading and the Pennsylvania Railroads have boomed Atlantic City, I am at a loss to understand. It can hardly be because a train of 360 passengers only pays operating expenses.

W. M. ACWORTH.

The German Traffic Manager.

New York, May 18, 1905.

To THE EDITOR OF THE RAILROAD GAZETTE:

The tariff officials of the European railroads have been surprised to read in your paper during the International Railway Congress in Washington the following criticism of their work by Professor Meyer:

In Continental Europe the regulation of railroad rates by public authority has reduced the railroad manager largely to a man who sits in his office and orders his subordinates to run trains back and forth.

This interpretation being perfectly erroneous, I beg you to allow me to give some words of explanation, as far as this is possible for me at the moment of leaving for home. The railroad tariffs have to be adapted to the commercial and industrial conditions of each country. It is very difficult, therefore, to compare the tariff arrangements of different countries. The layman is disposed to overlook this difficulty. In Germany, for instance, many point out that the average of the American freight rates is low, without recognizing that a comparison involving German freight rates is not simple, because the bases for the determination of freight rates, and indeed the statistics themselves, are quite different. On the other hand, in America many point out that the average of German freight rates is higher, but that these rates are more systematical, more regular and of greater stability.

Notwithstanding these differences the aim of every tariff official ought to be to promote commerce, industry and agriculture by reducing the costs of transportation as much as possible. This endeavor has a natural limitation, as it has to consider the earnings which are necessary to keep the road running and to pay the dividends on the investment. This creates the question as to how far rates can be reduced, when the public need demands it, with a view to increasing the traffic. This problem can only be solved when tariff officials are in constant touch with intelligent and broadminded shipper.

There are in Germany the following laws for this purpose:

(1) The classification of goods as well as the general tariff regulations, which are the same for all German railroads, have to be deliberated by a committee of railroad officials together with a committee of interested shippers. This latter committee must be composed of prominent representatives of commerce, industry and agriculture, and has to consider every change, even the most trifling, in the above-named regulations.

(2) Exceptional tariffs may be decided upon by the railroads, but have to be approved by the governments of the respective states. In most of the states, for instance in Prussia, Bavaria, Saxony, Baden, Württemberg and others, there are railroad councillors (Beiräte) who are elected by the Board of Trade, Board of Agriculture, and

other business men's associations. All tariff changes of any importance have to be put before these councillors for their opinion, and this, if possible, before execution. By these means it is possible to find out any detrimental influence of tariff changes, before they come into effect.

Tariff negotiations are sometimes placed (for instance, in Prussia) before the Parliament once a year, thus enabling it to express its opinion on the tariff policy of the railroads. Of course, there are often differences of opinion brought out in the meetings of the railroad officials and the representatives of the shippers, but both parties have the same aim; that is, to reduce tariffs gradually in order to conform them to the economical exigencies of the country.

The benefit of this collaboration is that the representatives of the shippers have confidence in the administration of the railroads, and that the railroad officials are perfectly conversant with the requirements of commerce, industry and agriculture. The variety of freight tariffs makes it impossible to explain their arrangement in a few words. I only wish to say that on the Prussian railroads 60 per cent. of all goods are carried on exceptional tariffs, and for the establishment of exceptional tariffs three points of view have to be considered.

(1) To promote industrial and agricultural production of the country by facilitating the transportation of necessary raw materials.

(2) To facilitate the sale of manufactured products, especially by low rates for export-goods.

(3) To assist the commerce of commercial centers in Germany, especially of German seaports, against the competition of foreign places.

Statistics prove the progress of commerce, industry and agriculture under this system. The freight traffic on the railroads of the Prussian government was 8,903,091,000 ton-km. in 1879 and 25,059,080,000 ton-km. in 1902, which means an increase of 182 per cent. The density of traffic per km. of track increased during the same period 92 per cent., viz., from 443,860 tons in 1879 to 853,068 tons in 1902. The increase of traffic of the more important classes of goods since 1885 (which is the first year after completion of the government ownership of the Prussian railroads) on all German railroads up to 1903 has been:

405 per cent. artificial manure.
194 per cent. potatoes.
190 per cent. flour and flour-mill products.
168 per cent. beets.
173 per cent. sugar.
126 per cent. lumber.
145 per cent. timber, ties and fire-wood.
117 per cent. coal and coke.
184 per cent. lignite.
189 per cent. iron ore.
241 per cent. manufactures of iron.
178 per cent. raw iron.
418 per cent. cement.
224 per cent. lime.
247 per cent. stone.
193 per cent. glass and glassware.
137 per cent. earthenware.
224 per cent. wood pulp.
289 per cent. paper and cardboard.

For German railroad officials the care for the interests of the general traffic, for the promotion of the economical life of the country, comes always first. You can readily see from this that the tariff official has a large field of productive activity and serious tasks for the promotion of the common weal; even if the railroad is under governmental control. This, however, is recognized by all our shippers, and they are not of opinion that the German freight traffic manager is "a man who sits in his office and orders his subordinates to run trains back and forth."

G. FRANKE,
Freight Traffic Manager of the Prussian State Railroads.

Thebes Bridge Formally Opened.

The formal opening of Thebes bridge occurred last week, on Thursday, the 25th inst. In preparation for the event souvenir invitations were sent out, containing a brief history and description of the bridge, photogravures in brown of different views of the structure, and an embossed front cover with a portal view. Guests from Chicago, including many prominent engineers, were taken to Thebes in a special train of eight Pullmans and two diners, going by the Chicago & Eastern Illinois and returning by the Illinois Central, both being members of the bridge company. There were also two special trains with guests from St. Louis.

Upon arrival at the bridge all three trains slowly crossed the structure to the Missouri side and returned, after which addresses were delivered by Gov. Folk, of Mis-

the actual loading in last Thursday's test will be found to be in excess of the estimate.

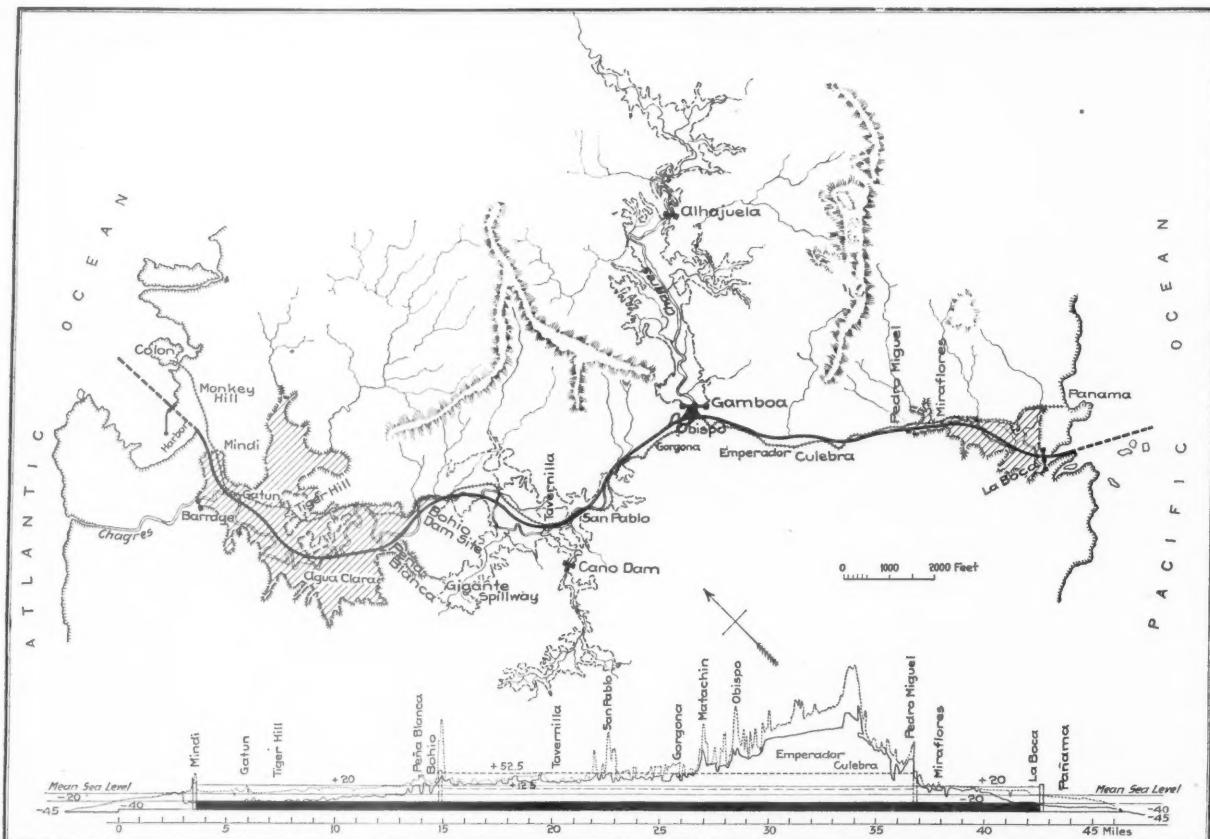
A New Project for the Panama Canal.

Mr. Lindon W. Bates has recently published two monographs in which he presents a plan of his own conception for building the Panama Canal and improving the terminal harbors on both coasts. His project for the new canal differs from any of the others heretofore proposed in many important details, but it seems to be based on sound engineering principles and is well worth careful examination. In order to have a clear idea of what he proposes to do it may be well to briefly enumerate the principal characteristic features of the four other plans which from the time of the first conception of the canal have received serious consideration.

The original plan of the old French Canal

tidal locks at Miraflores 1,000 ft. long and 100 ft. wide. The total estimated cost is \$230,500,000 for such a canal.

Mr. Bates' plan contemplates a canal with a summit level 20 ft. above mean sea level for the entire distance between Mindi on the Atlantic end and La Boca on the Pacific end. This would create large lakes at each end of the canal which he terms respectively "Lake Chagres" and "Lake Panama." Their waters would discharge through insubmergible, under-sluice barrages into tide water and twin locks would admit vessels from the harbors into the lakes at the canal level. The lake formed back of Mindi would be 11.8 miles long and would submerge a large swamp area which is unsanitary and presents great difficulties in excavating for a sea level canal. Similarly "Lake Panama" would submerge a swamp back of Panama from La Boca to Miraflores, $5\frac{1}{2}$ miles, and would have an area of seven square miles.



Bates' Project for a 20-ft. Level Canal Across the Isthmus of Panama.

souri; A. G. Cochran, General Counsel for the Missouri Pacific; Col. S. W. Fordyce, formerly President of the Cotton Belt and of the Kansas City Southern; Hon. W. J. Calhoun, of Chicago, and Prof. C. M. Woodward, of Washington University, St. Louis. Gov. Deneen, of Illinois, was to have been present but was prevented from coming.

At the conclusion of the addresses a loading test of the bridge was made by running 28 locomotives, divided between the two tracks, onto the 671-ft. channel span. This span contains a 371-ft. suspended span. While the exact figures for the loading are not obtainable at this writing, it was estimated to be approximately 4,300 lbs. per lineal ft. of track. The resulting deflection was $7\frac{1}{2}$ in. The camber at the center of the span is .56 ft., which is calculated to come level under a uniform load of 4,000 lbs. per lineal foot of track. On this basis the theoretical deflection for a loading of 4,300 lbs. would be 6.02 in. However, it is quite likely that

Company contemplated having the canal summit level 62.5 ft. above sea-level, to be created by a dam at Bohio and supplemented by a smaller dam at Alhajuela. This was the plan originally proposed by General H. L. Abbot. The second project is that favored by the Isthmian Canal Commission of 1901, which proposes an 85-ft. summit level canal. The third project, which has recently been elaborated, is for a 30-ft. level canal with two sets of locks, one at Bohio and another near Pedro Miguel. The fourth project is for a canal at sea-level without locks. In order to build such a canal a tide lock at Miraflores, a gigantic dam at Gamboa, and probably long diversion tunnels to carry away the impounded waters of the river Chagres would be required. This project was the basis for the recent action of Congress appropriating money for the construction of the canal by the United States. The preliminary plans provide for a sea-level canal 150 ft. wide at the bottom, with a minimum depth of water of 35 ft. and having twin

Of the total distance between oceans of $41\frac{1}{2}$ miles, $17\frac{1}{4}$ miles would thus be made lake navigation.

The most difficult engineering features embodied in all of the plans proposed for the canal have been involved in the regulation of the Chagres river and its tributaries on which depend the water supply for locking and which present serious dangers in time of flood. Mr. Bates proposes to divert the flow of all the tributaries of the Chagres on the east side between Mindi and Bohio into "Lake Chagres" and the tributaries on the west side also between Bohio and the Gigante. The Pena Blanca swamp at the head of "Lake Chagres" would be submerged to a level of + 30 and the overflow from its basin diverted through a spillway into the lake. On the west side between the mouth of the Rio Cano and Culebra all of the small streams could be led directly into the canal channel. The waters of the Rio Cano could be easily regulated by an under-sluice dam for which there is a suitable site. On the

Pacific slope the few small streams could be led into the canal channel without building extensive regulating works.

The waters of the Upper Chagres are the most difficult to control. Mr. Bates proposes to construct a large triangular junction basin at Obispo, which is almost half way be-

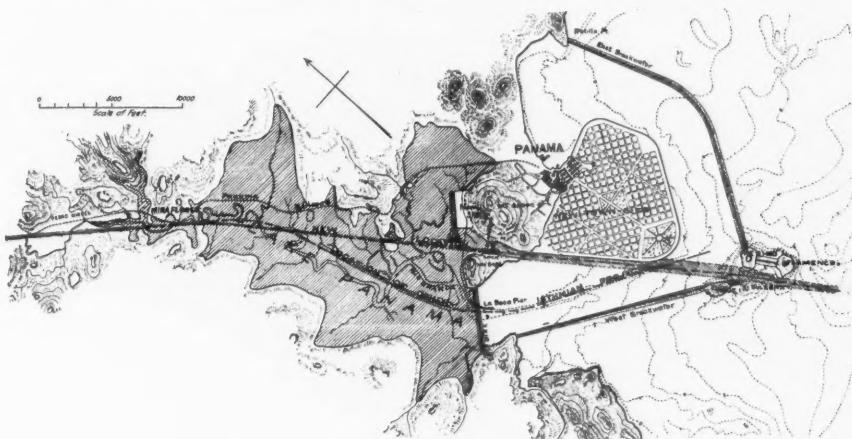
150 ft. and slopes of not less than 2.5 to 1 on the banks in earth cuts. The speed should be limited to five knots an hour on tangents in the sections of restricted width.

The pamphlet on the canal project discusses quite fully all of the engineering features of the Bates plan and points out its

mersion of large swamp areas; provision for turning basins at several points along the canal; and, finally, that the plan involves no problems which have not already been solved by engineers in other parts of the world on similar works of equal magnitude.

Proper provision for harbors and docks at each end of the canal is an important part of Mr. Bates' scheme, and he has worked out plans for artificial protected harbors both at Panama and Colon. The problem at Panama is comparatively simple as will be seen from the accompanying map. "Lake Panama" is formed by a dyke thrown across the narrow opening between the mainland, Mt. Sosa, and by the locks and barrage between Mt. Ancon and Mt. Sosa. From the shore end of the dyke a breakwater extends to the small group of islands off shore, and another breakwater north to Petillo Point encloses a large harbor, leaving an entrance through the group of islands. A new town site of large area is to be formed by depositing the excavation from Culebra in the bay, and ample dock room is provided along the dredged channel. Mt. Ancon affords fine protection for a naval station back of it in the lake basin, and fine fortifications could be built around the town.

The improvement of the Atlantic terminal harbor is a more difficult problem. "Lake Chagres" would be formed by a dyke thrown across the Chagres Valley and the entrance to the canal would be the locks and barrage at Mindi. The harbor at the entrance to the canal would be formed by a long breakwater from Colon across to Toro Point. This breakwater would cut off the worst part of the swell rolling in when the prevailing storms, or "northers," set in. A second



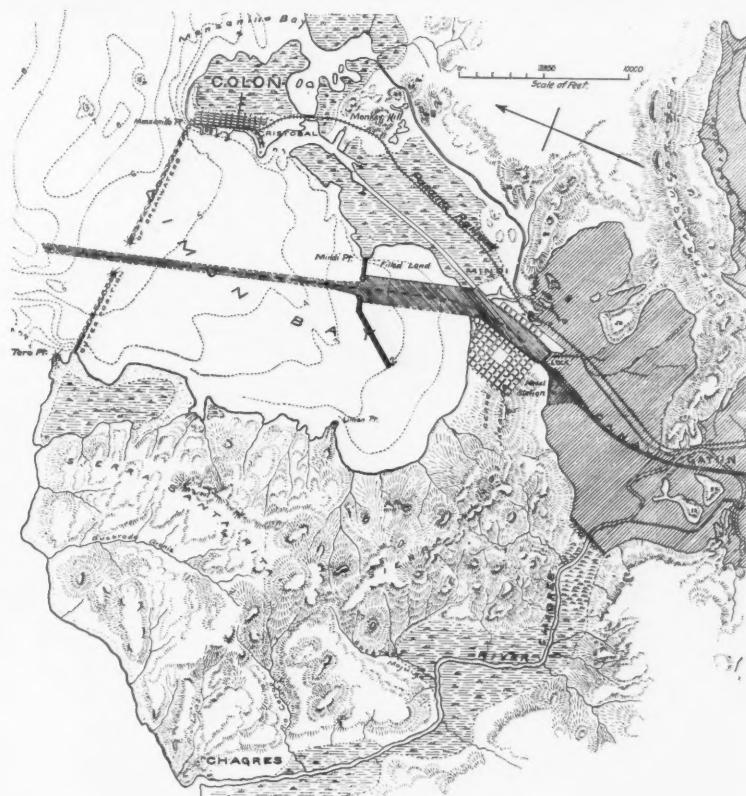
Proposed Harbor Development at Panama.

tween the inner ends of the two lakes, Panama and Chagres, at a point where the Chagres valley makes a right-angled bend. The discharge from the river would empty into this junction basin and flow in both directions to the lakes at the ends of the canal. The regulation of the Chagres river above Obispo requires two dams, one at Gamboa and the other at Alhajuela. The Gamboa dam will regulate the drainage of the Gamboa basin water-shed and the regulated outflow from the Alhajuela. The Alhajuela dam will control, regulate and discharge the drainage of the Chagres water-shed above that dam. Both of these dams will have in-submergible under-slutes to maintain the level of the Obispo basin. The smallest possible accumulation of water would be permitted behind the dams, but they could safely impound 900,000,000 cubic meters. The Gamboa dam would be 137 ft. high and the Alhajuela 154 ft. high. The dams proposed in all of the other projects yet brought forward vary from 200 to 265 ft. in height and involve serious difficulties in securing foundations for such immense masonry or earth structures.

A modification of this plan could easily be made by introducing dams and locks at Bohio and Pedro Miguel and raising the summit level between those points to + 50 with a net head at the dams of only 30 ft. This would give open lake navigation for a distance of 30 miles, or more than three-quarters of the total length of the canal. By adopting this plan the quantities of excavation would be greatly reduced and the time lost in transit by reason of the additional locks would be made up by reason of the greater speed allowed on the lake basin formed. The feeding of this upper level lake would require large reserve storage of water which could be obtained above the Alhajuela dam. No changes in the alignment of the canal are proposed by Mr. Bates except a new location of the channel through "Lake Chagres." The present location of the Panama Railroad would have to be changed in a number of places on account of the lakes and regulating works which form an essential part of the proposed plan.

As to the cross-section of the canal to meet the requirements of future traffic, Mr. Bates advocates building the canal to accommodate ships 1,000 ft. long, 100 ft. beam and 40 ft. draft. For such ships the cross-section of the canal should not be less than 8,000 sq. ft. with a bottom width of at least

principal advantages over any of the other proposed plans. These are briefly: Shorter time of completion and less cost because all of the excavation now completed can be utilized and 17 miles of the distance is impounded water requiring only a small amount of dredging in the channels, while much of the remaining excavation could be done with hydraulic dredges; less operating



Proposed Harbor Development at Colon.

expense because of minimum number of locks; a saving of from four to five hours in transit over a sea-level canal and longer over canals at high levels; better and safer regulation of rivers and streams during both the dry and wet seasons; improvement in sanitation of the country contiguous to the canal at both ends by reason of the sub-

breakwater extending out from Mindi Point would form an inner harbor which would be fully protected. By filling in land along the dredged entrance channel, good dock facilities could be had. A new town site is available at the entrance locks and an excellent naval station could be established under the hills on "Lake Chagres."

Building the Chicago Subway.*

An idea came to Chicago. It was summoned from the deep of the things which are not by the urgent need of the things which are. It got itself accomplished, and to its human agents it was as implacable as to its iron and to its cement.

Downtown Chicago is but eight blocks wide; it is but ten blocks long; it is strangled by a noose woven out of the lake, the river, and railroad tracks; it chokes. Its east is the lake and railroad tracks. Its north is the river, and, just beyond the river, railroad tracks. Its west is the river, and, just beyond the river, railroad tracks. Its south is a swollen, coagulated clot of railroad tracks, except for an aperture about two blocks wide, which can be regarded as the throat of Chicago just as the downtown district is the head.

Within this square mile are the brain-cells of Chicago. Around it cluster the terminals of far-flung railroad systems which penetrate into the farthest recesses of the continent. Streets are inadequate to such a situation. They were ingenious devices in their day, but they no longer suffice. They cannot accommodate freight. They are filled brimful with people and with street cars. Wagons hauling freight are an impertinence. Today, therefore, every building in downtown Chicago is on an underground electric railroad which connects with the surface steam railroads which in turn connect with all parts of America. The merchant will put his bale on an elevator. The elevator will drop down to the sub-cellars. The bale will be transferred to a car drawn by an electric locomotive sucking up its power from cogs between the tracks. This locomotive, embarrassed by the teamsters' union (which is the most embarrassing union in Chicago), will proceed to the yards of the Northwestern or of the Illinois Central or of the Pennsylvania or of any other railroad. The bale will be *en route* to its destination as soon as it is packed. Every downtown merchant will be on a switch-track.

This idea was wrung from the travail of business. Certain men assisted it into the world. They were grasped by it and bullied by it. They were flung into indirect, crooked courses. They began in a stifling atmosphere of traditional political corruption. They worked covertly. They undermined Chicago with a vast tunnel system without telling Chicago anything about it. And when they were dragged forth into the light they were all of them execrated and five of them indicted. Execrated and indicted, they had given Chicago a commercial revolution. If any revolution was ever accomplished without seeming to soil the hands of some of its agents, this was not that revolution.

The company was the Illinois Telegraph & Telephone Company. It got a franchise in 1899. The franchise said telephones. For telephonic purposes the company was authorized to build "conduits." It built "conduits." They were 7 ft. 6 in. high. They were beautifully adapted to the carriage of freight. When a city authorizes telephone conduits and gets freight tunnels it is excusable if it betrays some surprise.

Surprise was mitigated in this case by a recollection of the human bond between the Illinois Telephone & Telegraph Company, and the General Electric Street Railroad Company. General Electric came before Illinois Telephone and Telegraph. It got a franchise covering certain streets on the South Side. It said that it wanted to compete with the Chicago City Railway Company. Many aldermen who voted for it thought that it wanted to sell out to the Chicago City Railway Company. They were not misinformed. Wheeler, audacious pro-

moter, introduced to Chicago as the builder of an underground trolley system in Washington, was in General Electric. So was Judd, brilliant young lawyer. So was Hull, powerful Republican politician. All these men were afterwards in Illinois Telephone and Telegraph.

The Chicago City Railway Company did not yearn to buy the General Electric. It had all the streets that it wanted. It suspected the General Electric of bribing the council and of forging the frontage consents of property-owners along its route. It attacked the General Electric in court. There was in Chicago a man called Aldrich, a man of great legal reputation, who had been solicitor-general of the United States in the early nineties. General Electric went to Aldrich. Aldrich went into court and wrestled with the law so successfully that General Electric won several down. The Chicago City Railway capitulated. It bought the franchise of the General Electric Company for about \$1,000,000. These are the expenses which, among others, increase the surreptitious capitalization of public utility companies.

But General Electric, financially and politically, had cost much money. Even \$1,000,000 was not enough to go around among its friends. Aldrich's bill for his legal services remained unpaid. At this point Illinois Telephone and Telegraph begins to emerge. Aldrich was interested in telephones. He had stock in a company which manufactured telephone apparatus. And he had friends in St. Louis who wanted a telephone franchise in Chicago in order to enter into competition with the Chicago Telephone Company, which was the local monopoly. Francis A. Riddle, a lawyer, has testified in an arbitration case that Wheeler told him he was using a new telephone franchise as a means of recouping himself for his losses in General Electric. This telephone franchise was the franchise of the Illinois Telephone & Telegraph Company. The Illinois Telephone & Telegraph Company was the company which was destined to bless Chicago with freight tunnels. When the sources of a commercial revolution are uncovered they do not seem oppressively sublime.

The Illinois Telephone and Telegraph franchise was passed early in 1899. It promised free telephones to city officials. By motion of Alderman Brennan the civil service commissioners were excepted. Brennan said he didn't believe in giving civil service commissioners anything. His joke pleased the council and became legislation. Then Mayor Harrison sent in a veto. He said 50 years was too long. No company ought to have a half-century franchise even if it meant to compete with the Chicago Telephone Company, which few citizens would risk their lives in protecting from attack. Such vetoes made many business men feel that Mayor Harrison was not sufficiently zealous in encouraging business interests. He made a distinction between business interests and public interests. The fact that 50-year franchise bonds would sell better than 30-year franchise bonds did not convert him to the former.

The council receded from 50 and accepted 30. The Illinois Telephone & Telegraph Company was authorized for 30 years to have "a line or lines of conduits and wires or other electric conductors for the transmission of sounds, signals, and intelligence by means of electricity or otherwise." Freight may perhaps be intelligence when it consists of mail or of newspapers, and freight cars compared with wires, are certainly "otherwise." Aldrich's St. Louis friends, when the franchise was cut from 50 to 30 years, retired. So did Aldrich. He had supported the ordinance openly and honorably. He wanted telephones. Shortly

after his retirement the enterprise grew into tunnels. Judd testified in the arbitration case above mentioned that Wheeler discussed tunnels with him early in 1899.

No other company in its work of construction ever displayed such regard for the safety or for the comfort of the public. It was reported that the Chicago Telephone Company had frustrated its new rival by getting the city to forbid it to tear up the streets. The Illinois Telephone & Telegraph Company did not want to tear up the streets. It had no instinct for publicity. It did not want to kindle its eye at the sun like the eagle. It preferred to devote itself to a study of the mole, which goes almost as far and does not get shot so often. Its observation of the ways of the mole was not without results.

It began by digging a hole on private property in the rear of Alderman Powers's saloon. Through this hole it removed a good deal of the clay which underlies Chicago. Then it built a few headhouses at the intersections of the downtown streets. No one knew what these headhouses meant. They were just wooden covers to small holes and they never seemed to be doing anything. They never did do anything during the day. It was not till late at night that they began to gleam with an illumination from below. Then masses of clay began to exude from them into wagons, which drove quickly to the dump on the lake. By morning all was quiet and dark and innocent again. Just once the city had a twinge of suspicion. Alderman Hermann introduced into the council a resolution ordering the commissioner of public works to find out what the Illinois Telephone & Telegraph Company was doing. The commissioner reported that it was doing nothing in violation of its ordinance. Wheeler and four city officials were afterwards indicted on a charge of forgery committed on this report. Judd turned informer and brought the charge.

Meanwhile the citizens of Chicago continued to scurry about on the surface of Chicago and felt no tremor from underneath. What small rumors oozed out were dried up before they had flowed far. The gush of information came when the company tried to build a "conduit" 14 ft. high. The Commissioner of Public Works inspected it and stopped it and then did some more inspecting. Chicago woke up to learn that it possessed a vast, solidly built, widely ramified freight tunnel system.

Chicago is perhaps the only city in the world which has had a tunnel system introduced into its bowels without knowing anything about it. Kipling sings sweetly of certain situations which would make a tapeworm dizzy. In this case it was the sudden, happy owner of the tapeworm, it was Chicago, that felt an attack of dizziness coming on. It was necessary for Wheeler to act. He had a set of freight tunnels on his hands with no authority to carry freight. If Macaulay had known Wheeler he would have added a sentence to one of his most famous paragraphs. "He who has not seen Niagara has but a faint idea of a cataract. He who has not read Barère's memoirs may be said not to know what it is to lie." He who has not watched Albert J. Wheeler could write but a meager definition of the word audacity.

But Chicago needed tunnels. Why didn't Wheeler come out into the open and say that he would like to build tunnels? There are several answers to this question. Some say that Wheeler had become so accustomed to doing things deviously that it would have been a mortification to him to do them in any other way. Others say that he was afraid of the owners of the high buildings. He did not trust their intelligence. If he began to build tunnels under them with their

*William Hard, in *Public Opinion*.

knowledge they might secure injunctions against them. He preferred to get the tunnels built and then to persuade them that there had been no danger. Still others assert that he was afraid of the council. His acquaintance among the members of that body during the golden days of General Electric may not have been of a nature to cause him to trust them. He felt perhaps that if he went before the council with a novel project like tunnels he would have to admit more stockholders into the company than would consist with compact and effective management, while if it he postponed going to the council till the tunnels had been completed the pressure of the public demand for the immediate use of the tunnel system would force a speedy accommodation.

The accommodation came, but it was less accommodating to Wheeler than would have been the case if the council had not changed since General Electric. The ordinance granted to the Illinois Telegraph & Telephone Company in 1903, when compared with the ordinance granted to the same company in 1899, measures the advance meanwhile made in public vigor in Chicago. The first ordinance was a sieve. Almost anything could wriggle through it. The Chicago Federation of Labor says that it also was corrupt. The federation appointed a committee which reported the use of \$110,000. If this money was used there was blackmail. The ordinance was not a bad one morally. Almost all the best aldermen in the council, men who cannot possibly be suspected of corruption, voted for it. Nevertheless it was a sieve.

The second ordinance is almost watertight. It specifies the dimensions of the excavations which the company may make. It provides that in 1929 the tunnels shall automatically become the property of the city without any payment of any money at all to the company. It provides that compensation shall be paid to the city as follows: For ten years, 5 per cent.; for the next ten years, 8 per cent., and for the rest of the term of the franchise 12 per cent. of the company's gross receipts. It provides that the tunnels shall be lowered if they ever inconvenience a municipal street-car subway.

The history of the New York street-car subway began on an eminence of conscientious respectability with a rapid-transit commission of not too rapid citizens. The history of the Chicago freight subway began in a bog of intrigue. The work on the New York subway was done after careful calculation publicly. The work on the Chicago subway was done so clandestinely as to be an insult to the city as well as a joke on it. Nevertheless the New York subway is in private hands for private profits for 50 and perhaps for 75 years, while the Chicago subway will be taken out of private hands forever in 1929. For the construction of the New York subway the credit of the city was advanced, while for the Chicago subway private capital took all the risk. The company operating the New York subway is authorized to charge a fixed 5-cent fare, while the company operating the Chicago subway must permit the city to regulate its charges at any time. Finally, the New York company has a taxation arrangement which means that it furnishes practically no revenue to the city, while the Chicago company is obliged to pay an annual compensation so large that many disinterested citizens regard it as exorbitant and confiscatory.

Amid these weighty and impersonal arguments, succeeding the passage of the second ordinance, the art of gossip would have been lost and the shades of municipal science would have completely closed about the tunnel system had it not been for Judd. Judd irradiated the scene by the indictment of Wheeler and of four other persons on a

charge of "altering a public record." The record altered was the report of the proceedings of the city council on the night when it received from the Commissioner of Public Works his opinion that the company was not exceeding the authority conferred upon it by its ordinance. The commissioner was honest. The company told him that it needed 7-ft. 6-in. "conduits" in order to have room for the big reels from which its telephone wires were to be unrolled.

Did the council merely place this opinion of the commissioner's "on file," or did it "approve" it? Judd says that Wheeler had the record altered by securing the insertion of the word "approved." Wheeler then persuaded men with money to come into the enterprise by showing them that their suspicions about its illegality were unfounded and that the city council had given it its sanction. If Wheeler did anything of this

and financially. He asked Wheeler for money. He couldn't get money. He tried to get revenge.

Such are the human circumstances out of which a superhuman industrial improvement has grown. To recount them is to calculate the size of man compared with the size of the social forces which are sweeping him on toward greater and greater social exploits.

Arrangement and Operation of American Freight Yards.

The West Albany Yard of the New York Central.

BY GEORGE L. FOWLER.

The American freight yard, as it stands to-day, is like the rest of the elements and combination of elements of the railroads to



West Albany Freight Yards Looking West from Watervliet Ave. Bridge, New York Central & Hudson River Railroad.

kind he tricked the men with money. An "approval" by the city council of a report from the Commissioner of Public Works is not an ordinance. It has no legal value. It sanctions nothing. It confers no authority.

Even if Wheeler is found guilty, therefore, his tunnel franchise will be just as good as it ever was. The investors whom he coaxed into the company by exhibiting a forged entry in a worthless council record may per-

haps feel slightly humiliated. But the company is now secure in its rights. The investors might as well conclude that they were deceived for their own good by a benevolent and pious white lie. Before indicting Wheeler, Judd ran away from Chicago with a woman who was not his wife. He was drinking. He was gambling. He came back to Chicago a broken man, physically

which it belongs, the result of a long and slow development from the small beginning when each road was a law unto itself and

complete in itself, and it has been brought

to its present condition by the usual long

series of trials and errors. There are cer-

tain principles of construction that an at-

tempt has been made to follow in the yards

of recent construction laid out *de novo*, to

which it is hoped to call attention in a later

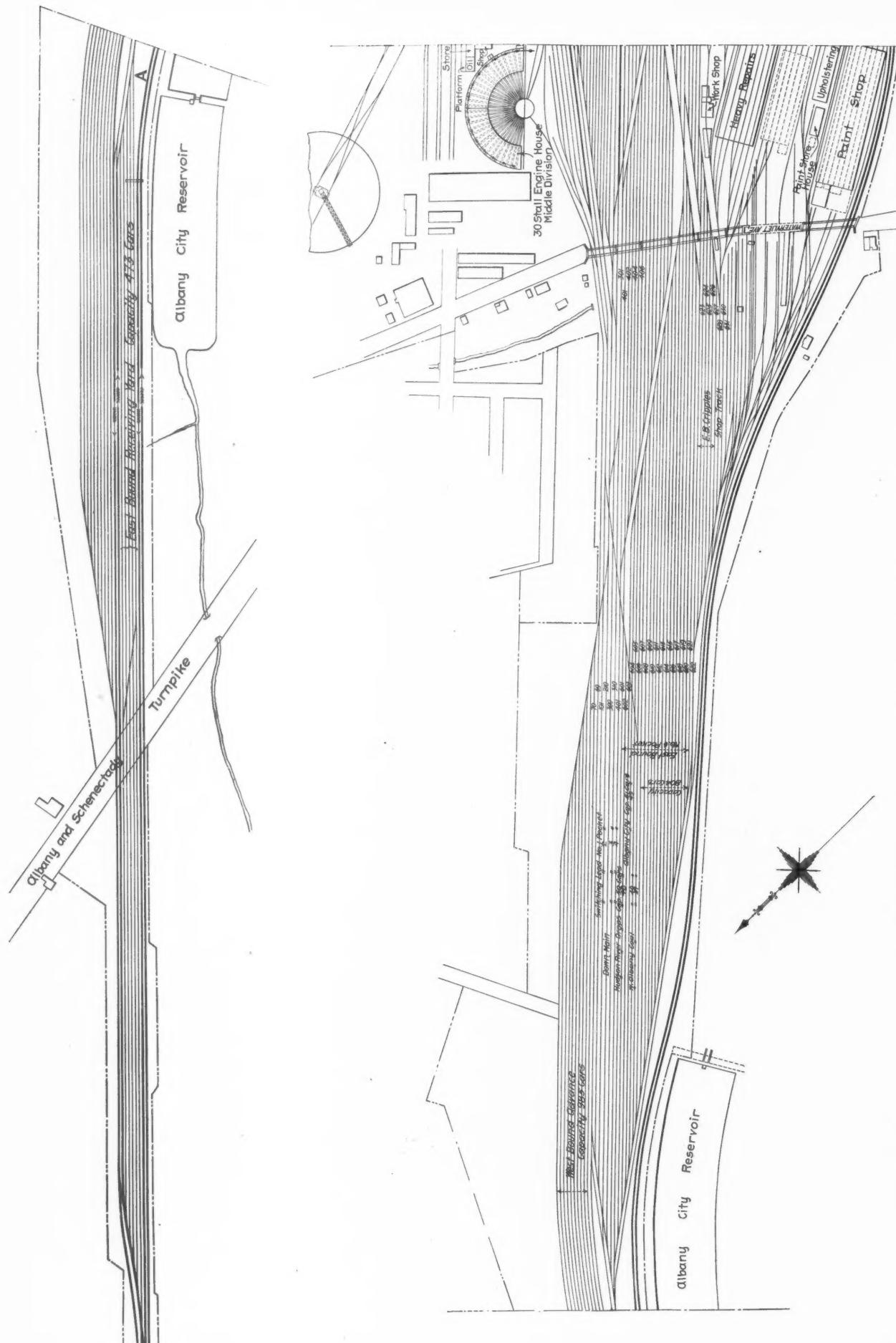


West Albany Freight Yards, Looking East, from Watervliet Ave. Bridge, New York Central & Hudson River Railroad.

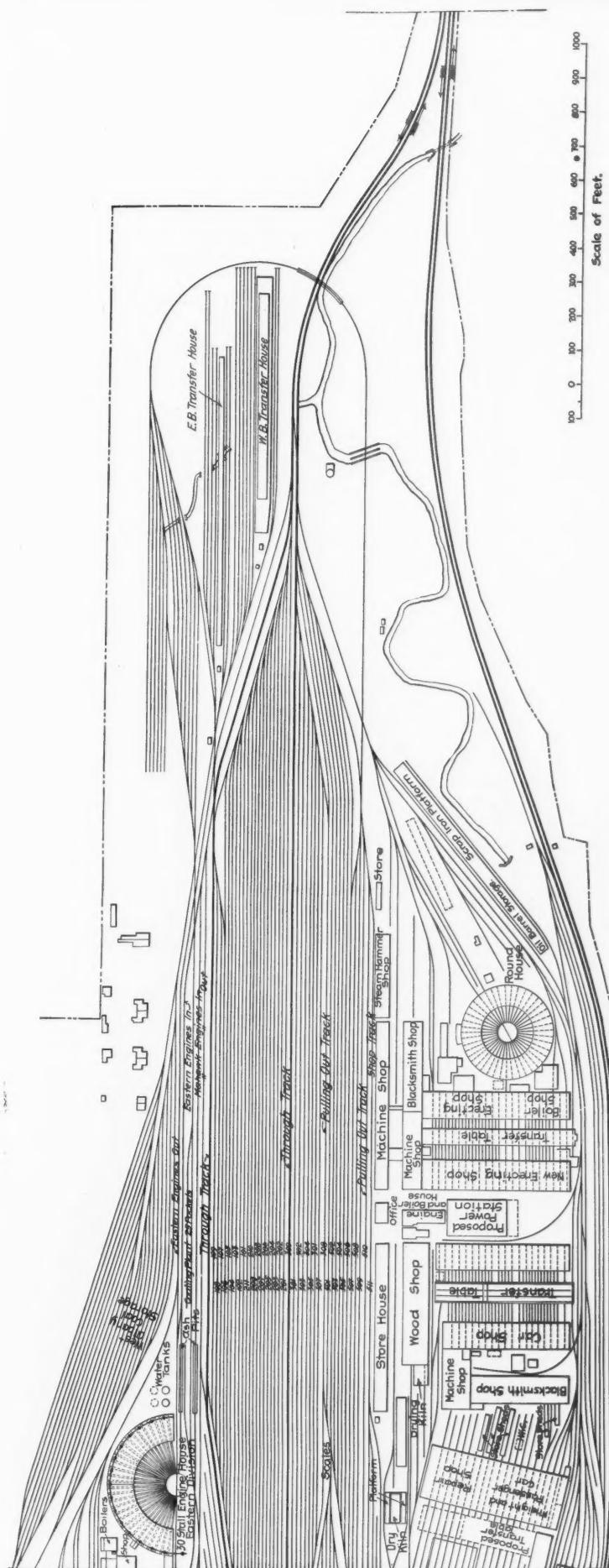
haps feel slightly humiliated. But the company is now secure in its rights. The investors might as well conclude that they were deceived for their own good by a benevolent and pious white lie. Before indicting Wheeler, Judd ran away from Chicago with a woman who was not his wife. He was drinking. He was gambling. He came back to Chicago a broken man, physically

article. But in the case of many of the old yards that have grown from small beginnings to centers of freight receipt of great magnitude, it is still impossible to arrange and operate them in the best possible manner, and they are confessedly weak in many particulars.

In order to show what can be done in a yard of such character that is skillfully han-



West Albany Freight Yards—New York Central & Hudson River Railroad.



West Albany Freight Yards—New York Central & Hudson River Railroad.

dled, the yard of the New York Central at West Albany, N. Y., has been chosen.

It will be conceded that a yard through which all of the east and westbound traffic of the four-track line extending from Albany to Buffalo passes must have more than an ordinary capacity. Situated as it is at the "Gateway to the West," it must take care of the traffic intended both for New York and New England. This yard is at the head of the heavy grade rising out of Albany to the west and is 208 ft. above the Hudson. It lies in a comparatively narrow valley between two low ranges of hills. The length of the yard from east to west is 12,800 ft., and the greatest width, not including the shop tracks, is 900 ft., where there are 66 lines of track. The total trackage of the yard proper amounts to about 73 miles, with a capacity of 6,100 cars. In this there are 392 switches. In addition to the yard itself there are nearly six miles (5.8) of track serving the engine houses, car shops, erecting and boiler shops and transfer tables, which have an additional capacity of 311 cars. It will be seen from the plan that the yard lies between the extensive shops on the south and the roundhouses on the north. Further than this the yard labors under the disadvantage of being split into two yards by the main line of eastbound freight tracks, although no attempt is made to keep them clear from end to end.

The freight and passenger tracks are parallel to each other as they approach the yard from the east. A curve to the left along the line of original location carries the passenger tracks to the south of the shops and along the foot of the hills lying on that side. A sharp curve to the right takes the freight tracks to the north, where they run down through the yard in an unbroken tangent for the greater part of its length, but unfortunately divide it into two parts, as already stated. For convenience in the sorting and classification work the yard is arranged in a series of pockets. These are practically small yards in themselves and are worked by a single engine and crew, whose movements are unhampered by the others in the yard as a whole. Each pocket is so laid out that trains may be brought in from the receiving tracks without interfering with the work in the others. As will be seen later, those pockets devoted to eastbound traffic are worked by gravity while the westbound are worked by an engine for every movement.

With this introduction as to general conditions let us examine into the details of the arrangement and operation. Starting with the westbound traffic the train upon entering the yard is run in upon one of four receiving tracks. These are Nos. 201, 202, 203 and 109. It will be seen that the first three of these tracks lie alongside each other and next to the eastbound main line, while the last is adjacent to the westbound line.

The cars as thus received are hauled out for sorting and classification in the pockets. These pockets are numbered as indicated on the plan. Pocket No. 1 contains tracks 101 to 109 inclusive, the last serving as a receiving track. Pocket No. 2 takes in tracks 204 to 211, and pocket No. 3 tracks 301 to 307 inclusive.

The classification that is used in the yard for both east and westbound freight is that of divisional or station order and grouping. The division between West Albany and Syracuse includes the arrangement of the cars in station order, but with all air-braked cars next to the engine. Beyond Syracuse all cars are grouped and no attempt at station order arrangement is made. As there is a large empty westbound movement there is

of the cars and their delivery, and in addition to this that of the delivery to and receipt from the transfer house. So that there must be at least two entries made for every car entering the yard. Hence for the 67,922 east and westbound cars passing through the yard in the month of January there must

tion. In the case of outgoing trains, the record is supplied by the number taker, who obtains his destination indications from the chalk marks on the car.

In addition to the regular work of incoming and outgoing trains, there are a great number of movements between the West Al-

0 to 9 the last number of the car being the index number. Thus car 11,829 would be put in column 9. The superintendent of freight transportation and car accountant is then asked for the routing, which, when it is received, makes it possible to cancel the record from the special book and transfer

600

CAR NO.	INITIALS		RECEIVED		DESTINATION		YARD RECORD		FORWARDED		INITIALS		RECEIVED		DESTINATION		YARD RECORD		FORWARDED		INITIALS		RECEIVED		DESTINATION		YARD RECORD		FORWARDED		
	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE
50																															
51																															
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56																															

Book Record.

CAR NO.	INITIALS		RECEIVED		DESTINATION		YARD RECORD		FORWARDED		INITIALS		RECEIVED		DESTINATION		YARD RECORD		FORWARDED		INITIALS		RECEIVED		DESTINATION		YARD RECORD		FORWARDED	
	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	INITIALS	DATE	FROM TRAIN	
00	C	1/26	5	20	40	4																								
01	B	1/14	6	4	4	4	1/21	6																						
02	C	1/20	54	36	4	4	1/26																							
03	C	1/29	10	32	3																									
04																														
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Details of Book Record.

have been at least 135,844 entries. As a matter of fact, there were many more than this. For every car sent to the transfer house, there were two entries, and as many more for every car sent to the shops, though these latter are kept in a separate book with the same ruling. It is therefore well within limits to say that there are at least 144,000 car records made in these books every 30 days, or an average of more than 4,600 daily. This work is done by four men.

The record for outgoing trains is obtained from a loose sheet sent in by a messenger from the number taker. After the train is made up, this man goes down the side and makes a memorandum of the car numbers and initials. The slip thus sent in contains also the train number, conductor's name, number of engine and time of departure. The destination has already been entered from the running slips when the car entered the yard, with the exception of those coming out from the transfer house, the destination of which is reported direct from the house on a special slip.

This completes the record work of the yardmaster's office for the eastbound traffic. The books form the permanent portion of the same and are referred to hundreds of times daily in the tracing of cars. One clerk is employed all of the time in a consultation of the records connected with the tracing of cars through the yard, his duties extending in the case of rush work, to the actual location of the car in the yard, and the notification of the yardmaster as to where it is standing so that it may be pulled out and sent on its way at once.

As already stated, the work on westbound cars differs slightly in detail. The conductor on entering the yard from New York or the Boston & Albany Division does not deliver his running slips to the car markers but to the yardmaster's office. They are there taken by the carmarker, transferred to a slip, and from this slip the cars are chalked to destination. The tally thus used then comes back to the office for regis-

tary yard and that at Karner's, about four miles west, where there is a large storage yard. These movements amount to several thousand cars each month and the record in permanent form is kept in the books already referred to and described.

Thus far attention has been directed solely to cars passing through the yard on regular running slips. It frequently happens, however, that empty foreign cars are received without any destination cards for home route delivery. In such cases the car is recorded in a separate book with no special rulings and under numbered columns from

it to the permanent record. Finally, four train register books are kept, showing the general make-up of the trains and the yardmaster's number that is assigned to each. This number is given consecutively and forms the running number by which the dispatcher handles the train on the road. This register includes the name of the conductor, and whether the train was received or delivered to the Boston & Albany, the Hudson River, or the Mohawk Division, train number; engine number; time of arrival or departure; number of loaded or empty cars, and destination of train as to division or connection.

This includes the records that are kept in the yardmaster's office, but it follows, of course, that there must be a number of re-

FORM 238.

C.H.S. 4-16-03-2M

NEW YORK CENTRAL & HUDSON RIVER
R. R. CO.

2-7-05.

ASS'T YARDMASTER'S REPORT.

1. Caboose	21. Boston
2. Transfers	22. B. & A.
3. 45 drops	23. B. & A.
4. 35 Troys	24. B. & A. rushes
5. 25 Fishkill & drops	25. No. Adams
6. 45 New Yorks	26. Shops
7. 20 "	27. "
8. 25 "	28. "
9. 50 Troys	29. "
10. 55 B. & A.	30. "
11. 30 Chathams & No. 31. On hill Feb. 7, 1905.	
	2346 = No. 6
12. 25 B. & A.	West End.
13. 25 No. Adams	2368 = No. 5
14. H. R. Flour	West End.
15. W. G. M.	
16. Shops	
17. Chatham	
18. No. Adams	
19. No. Adams	
20. Albany mdse.	

Form 238.

ports sent out from the same office. First, there is a report rendered by the assistant yardmaster to his successor for a day or night. This shows the number of the various classes of cars that are on hand, the tracks that are filled or upon which work is being done, by means of which the man

Head Brakeman.

DATE

Form X.

coming on duty is able to grasp the situation at once and avoid all delays in the prosecution of his work.

The second is similar and is made out for and by the men in charge of the several pockets on the blank X. This is handed to their successors when they go off duty, and serves the same purpose as the one previously described in giving to the man in charge of the pocket the information that he requires for an uninterrupted continuance of the work.

Reports are also made to the superintendent at Albany, the general superintendent in New York and the car accountant. One form of report is sent twice daily to the office of the superintendent on blank M.

This is rendered at 7.30 in the morning and 3.30 in the afternoon, and gives a résumé of the number of cars in the yard at these two hours for the several destinations printed thereon. Two telegraph reports are sent daily to the general superintendent on blanks A and C at the times indicated there-

on. This gives the condition of the yards in the morning. It may be noted here that the letters in the several columns are code letters used for telegraphic purposes only. It will be seen that Blank C gives a very complete résumé of the situation and will enable the general superintendent to grasp it at once. The reports to the car accountants are more elaborate and enter into greater detail than do any of the others. One is the empty car movement for the 24 hours ending at midnight and shown on Blank M.

It will be noted that this does not include the ordinary foreign empties en route home, which may be con-

sidered outside the pale of regular traffic.

Blank Y R is a telegraphic report of the passage of a fast freight. These trains, consisting of stock cars or perishable goods, are usually sent through without breaking bulk, and the report enables the car accountant to follow the movement of the train with-

FORM 312. C.H.S. 8-4-04-1M.
BLANK C.
New York Central & Hudson River Railroad Co.
TELEGRAPHIC REPORT OF FREIGHT SITUATION AT W. ALBANY, KARNE & CARMAN 8 A. M.

CARS EAST AND SOUTH		W. Albany W A	Karne G H	Carmen A S	CARS NORTH AND WEST		W. Albany W A	Karne G H	Carmen A S
A	Cars Held for Billing				W	Mich. for Mich. Div.			
B	" " B. & A. Inspection				X	" " M. & M. Ry.			
C	" " " Ready				Y	" " R. W. & O.			
D	" " " in Shop				Z	" " Penna. Div.			
P	Grain for B. & A.				AB	" " Western Div.			
G	Coal				AC	" " Lake Shore			
H	Others				AD	" " Mich. Cent.			
J	Miles for W. Albany Trans.				AF	" " All Others			
E	Melrose Junction				AG	Empty System Grain			
M	Grain for New York				AH	" " Stock			
N	Stone				AK	" " Ordinary Box			
O	Miles				AM	" " Coal			
P	" " " Manhattan				AN	" " Flats			
Q	" " " 60th St.				AO	Western Box and Line			
R	" " " 33d St.				AP	Other Foreign Box			
S	" " " Park				AQ	M. D. T. Refrigerators			
U	" " " Barclay St.				AR	Other Foreign Cars			
V	Hed. Div. Points					Total North & West			
	Total East and South								

Cars on Hand for Uploading at W. Albany, Albany, Troy and Vicinities; also Empties and Cripples awaiting disposition.

W. Albany W A	Karne G H	Carmen A S	W. Albany W A	Karne G H	Carmen A S
BA	Miles for W. Albany		BM	Coal for Morton	
BC	" " Albany		BN	Other Coal	
BD	" " Rensselaer		BO	Stop-off Grain	
BP	" " Troy		BP	" " Other Cars	
BG	Flour for Russell in house		BQ	Crippled Cars	
BH	Freight		BR	Empties to Shift	
BJ	Lumber for Boats		BS	Condemned Cars	
BN	TOTAL				

* Include all System Grain and Box, 25-ton capacity or over.

† Include all System Box less than 25-ton capacity.

Form 372.

Copyright 1904 by C. H. Wright. 3-20-300M.
FORM C. A. 183. REVISED. C.H.S.
N.Y.C. & H.R.R.R.R.CO.

DUPLICITY RUNNING SLIP FOR
FOREIGN CAR.

CAR No. _____

TRANSFERRED TO _____ CAR NO. _____

AT _____ DATE _____

STOP CAR AT _____

FOR _____

TO _____

JCT STA _____

VIA _____ R.R. _____

R.R. _____

CONTENTS _____

FROM _____

LINE W. B. NO. _____ DATE _____

BILLED TO _____

CONSIGNEE _____

TO ORDER _____

NOTIFY _____

ICE CAR AT _____ HOUSE _____

HOUSE _____

HOUSE _____

ESTIMATED OR MINIMUM WEIGHT CAR AND CONTENTS:—

CONTENTS _____ LBS. _____ TONS

CAR _____ LBS. _____ TONS

ESTIMATED WEIGHT FOR ENGINE RATING _____ TONS

WEIGHED AT _____ DATE _____

NET _____ LBS. _____ TONS

TARE _____ LBS. _____ TONS

ACTUAL WEIGHT FOR ENGINE RATING _____ TONS

LIGHTERAGE, GRADING AND OTHER SPECIAL NOTATIONS:—

SEE OTHER SIDE.

Front.

Form C. A. 183.

carded and the traveler must be provided with the baggage of the shape that is in vogue in America, perhaps at considerable cost. There is often a considerable delay in handling and delivering baggage, which causes the English traveler some annoyance. In fact, I prefer the trouble of looking after my own luggage on the journey to the check system which saves that necessity, but substitutes the worry of delay and waiting at the end of a journey. On the whole, perhaps the trains run more smoothly in the Eastern States than in England. Whether this is explained by the length of the cars, the laying of the line, and the sleepers being close together, requires more technical knowledge than I can pretend to have.

I have been much astonished in many places to see people walking on the tracks and using them as if they were a main thoroughfare. This must be extremely annoying to railroad companies, and necessitates the use of bells on the engines, which seems a primitive plan in the midst of so many extremely modern methods of work. I have also been surprised at the number of level crossings and the way the tracks run through the open streets of a town. Of course, one understands that the town is probably of mushroom growth since the arrival of the railroad.

I have been much impressed by the amount of improvement work being done on some of the lines, notably the Pennsylvania, and the vast sums that are being expended. One cannot help hoping that such improvements may lead to a diminution in accidents. People in this country seem to take accidents as a necessary part of a railroad system and they do not create such a feeling in the public mind as we should experience in similar circumstances. There usually seems to be no serious effort at inquiry to bring home the blame to any particular person or fault in construction, so that nothing is done to prevent a like thing happening again. In the earlier days when the object was simply to "get there" and open up new country as quickly as possible, the lines were hastily built and accidents may well have been expected. But on the best improved lines, where everything is so up to date, the apparent carelessness seems remarkable. I have been immensely impressed with the strenuous efforts to cope with the ever increasing freight office. The great engines with huge haulage power, steel trucks to carry 50 ton weights, and all the arrangements for handling them, are truly astonishing. It was most fascinating to watch the sorting of freight trucks in the Pennsylvania yards at Altoona, where they were taken over a "hump," and by pressing a button in the signal box each truck was sent down its own particular track, and they were thus sorted out by one man as easily as playing notes on a piano.

Nothing seems to daunt an American in improving an existing system. When the railroad companies introduced 50 ton trucks, the firms who shipped coal found them extremely inconvenient, and immediately invented the most wonderful crane for lifting trucks bodily and emptying them like little baskets into the ships. I was intensely interested in seeing these at Buffalo and Cleveland. In the locomotive work shops, in the same way, ingenuity is apparent everywhere. The saving of labor in every department by automatic machines and electric power is truly remarkable. One of the things I shall never forget was seeing an electric train capable of lifting 100 tons pick up an engine weighing 85 tons and play with it backwards and forwards for my edification.

Locomotive engineers have no wish indefinitely to prolong the lives of their engines. The engines are not finished off to

last for as many years as ours, and they are quite satisfied to discard them at the end of ten or twelve years on the chance of replacing them by a newer or perhaps better pattern. In some factories I could not help feeling a little that although they are justly proud of the enormous quantity produced, they might not be equally so particular about the highest standard being maintained or even feel that it was necessary. On inquiry how the English workmen work beside their American cousins, I was told that after a time they are equally fast and efficient, but at first "they were too particular."

Generally speaking, I have been greatly impressed by the vastness of railroad problems here and cannot fail to admire the administrative capacity of the railroad men who are coping with them.

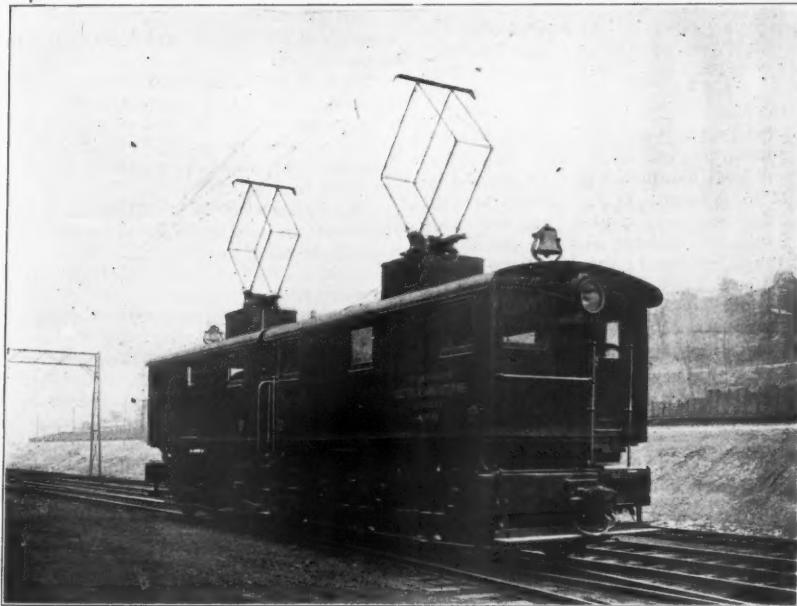
Westinghouse Single-Phase Electric Locomotive.

The accompanying illustration shows the latest development in heavy electric traction, an electric locomotive weighing 135 tons complete and designed for comparatively slow speed operation with single-phase alternating current collected from an over-

ft. The wheels are 60 in. in diameter mounted on 8-in. axles spaced 6 ft. 4 in. between centers so that the rigid wheel base of each unit is 12 ft. 8 in. The side frames of the truck are of cast-steel and are spring supported in the usual manner with equalizers. The cabs are built of sheet steel with angle-iron framing and the entire cab is removable from the frame and axles.

Each axle carries a 225 h.p. single-phase series motor of the single reduction geared type, giving a total of 1,350 h.p. with a gear reduction of 18:95. One side of each motor is supported directly on the axle and the other side is suspended from the truck frame on spiral springs. The motors are of the same general construction as the standard form of Westinghouse alternating current railway motors of smaller size which are now in use on a number of lines recently equipped. They are arranged so that forced ventilation from blowers in the cab may be used to secure increased output.

The motors and auxiliary machinery are designed for a current of 25 cycles and a trolley voltage of 6,000 volts. On the Westinghouse Interworks Railroad a No. 000 grooved trolley wire with catenary suspension is used. The current is collected by a pneumatically operated pantograph trolley



Westinghouse Single-Phase Electric Locomotive.

head conductor at 6,000 volts potential. The successful application of single-phase alternating current at moderate potential for small traction units was a long step forward, but this heavy locomotive which is now in operation opens up a new field and gives promise of proving to be the solution of many of the difficulties hitherto considered as inherent to any electrification project for trunk line steam roads. The locomotive was built by the Westinghouse Electric & Manufacturing Co. and is being operated on the Westinghouse Interworks Railway, East Pittsburg. It is the first alternating current locomotive in America, and is the largest machine ever built to take current from an overhead conductor.

The locomotive is built in two halves, each mounted on a six-wheel truck with rigid wheel base. These are coupled together and are intended to operate normally as a single unit although each half may be operated separately if desired. The length of the two units is 45 ft. over all and the width is 9 ft. 8 in. With the trolleys lowered the total height above the rail is 17

on each half of the locomotive. The trolley mains are carried down inside the cab and pass the current through a suitable oil switch and circuit breaker to an auto-transformer mounted in each cab. These transformers reduce the voltage to 325.

The method of motor control is extremely simple and efficient. The three motors on each half of the locomotive are connected permanently in parallel and the speed is regulated by varying the voltage through an induction regulator. The master controller has four positions, closed, starting, running and accelerating. With the handle in the closed position all current is off the car, the main switch being open. Moving the handle to the first notch closes the main switch and throws the reversing switch in the desired direction. Further movement to the second notch has no effect on the equipment as this is a neutral or running position. When the handle is thrown to the third notch, the small series-wound motor of the induction regulator is started and the main motors begin to pick up speed. When the desired speed is obtained the controller han-

idle is moved back to the second notch and the induction regulator automatically keeps the motors running at the same speed. When a further increase in speed is desired the handle is thrown to the third notch again and held there until the speed builds up, when it is again thrown to the second notch. To stop the handle is returned to the closed position, the main switch is opened and the regulator returned to its normal position. All of the movements of the switches and control apparatus are made by electrically operated pneumatic valves with low potential circuits from the master controller. Forced ventilation is used in the auto-transformers and induction regulator as well as the main motors, the necessary air being supplied from a motor driven blower in the cab. A motor driven air compressor supplies air for the brakes and for operating the control switches.

The locomotive is designed for slow speed freight service, this type having been chosen because the design of series alternating current motors for very slow speed service presents many more problems and is much more difficult than the design of equal capacities for the ordinary conditions. This problem having been solved, the production of similar locomotives for passenger service becomes a relatively simple matter. With the motors working at nominal full load output the locomotives will develop a drawbar pull of 50,000 lbs. at a speed of approximately 10 miles per hour. On several occasions, however, when hauling a 50-car train steady drawbar pulls of from 60,000 to 65,000 lbs. have been recorded on the dynamometer car and momentary efforts as high as 100,000 lbs. have been obtained with no sign of slipping of the wheels. With lighter loads the locomotive may be run at higher speeds up to a maximum of about 30 miles per hour.

At the reception to the delegates to the International Railway Congress given by the Westinghouse Companies at Pittsburg, May 16, a demonstration of this locomotive was made. A train of 50 cars weighing 1,200 tons was used and the machine handled the train without difficulty.

International Railway Congress Delegates at Schenectady.

On May 26 the American Locomotive Co., in connection with the General Electric Co., entertained at Schenectady, N. Y., some 200 foreign delegates to the International Railway Congress. The greater part of the morning was given over to a visit to the works of the American Locomotive Co. After an elaborate luncheon on the third floor of one of the new buildings of the locomotive works, the party was taken in a special train to see an exhibition run of New York Central & Hudson River Railroad locomotive No. 6,000, the joint product of the American Locomotive and General Electric Companies. The balance of the afternoon was devoted to an inspection of the plant of the General Electric Co.

There is not the slightest doubt that the visitors saw much of interest in both works and at the trial run of the electric locomotive; but the real feature of the day was the luncheon. The delegates had spent almost two weeks as guests of the American Railway Association, during which time they visited Altoona, Pittsburg, Cincinnati, St. Louis, Springfield, Ill.; Chicago, Niagara Falls, Montreal and Saratoga Springs; and while the tour ended officially in New York City May 27, the gathering around the tables at Schenectady was accepted as the real climax. Mr. R. Fane-de-Salis, Director of the North Staffordshire Ry., England; Mr.

Charles Jenny, Chief Engineer, Southern Ry. of Austria; Mr. Eduoard Sauvage, Engineer in Chief, Western Ry. of France, and Mr. E. H. Stieljes, Representative of the Government of Holland, in brief speeches expressed freely, on behalf of the delegates to the International Railway Congress, gratitude for the many courtesies shown them while in America. Mr. A. J. Pitkin, President of the American Locomotive Co., presided. A party of guests accompanied by Mr. Leigh Best, Third Vice-President and Secretary, and Mr. Charles B. Denny, Treasurer, of the American Locomotive Co., and Mr. John Havron, President of the Rogers Locomotive Works (now a part of the American Locomotive Co.), went to Schenectady from New York the night previous, returning to New York Friday night.

Brown's Discipline on the New Haven.

General Manager Higgins, of the New York, New Haven & Hartford, has issued a statement concerning the enforcement of discipline, a matter that has been under consideration for several weeks. It says:

Commencing June 1, 1905, the enforcement of discipline by suspension (except as noted in rule 6) will be discontinued and discipline by record will be inaugurated.

Until further notice this will apply only to employees in engine, train, yard and telegraph service.

1. This system is introduced with the belief that it will be of benefit, and that it will meet with the approval and cordial co-operation of all concerned.

2. The objects to be obtained under the new system are:

(a) To avoid loss of wages by persons employed and suffering to those dependent upon their earnings.

(b) To stimulate and encourage all persons engaged in company service in the faithful and intelligent performance of their duties.

3. Superintendents will keep record of the service rendered by each employee under their jurisdiction. An accumulation of demerits or suspensions, showing that an employee is not desirable for the service, will call for special consideration.

Whenever the service of any employee is so generally unsatisfactory as to unfit him for further service, dismissal will follow.

4. No record shall be made against any employee without notice to him and an opportunity for explanation and defense with witnesses who are familiar with the case.

Each employee will be notified promptly in writing of entries made against his record. He will upon request be shown his own record, but not that of any other employee except on written request of that other employee. If an employee leaves the service for any reason he shall, upon application, be given a transcript of his record.

5. Bulletins showing cases of discipline, omitting name, date, train, location and penalty, containing a brief account of the facts in the case, and showing how the offense could have been avoided, will be issued from time to time as considered necessary or desirable.

Special credit will be given on an employee's record and may also be bulletined for notably excellent conduct, good judgment in emergencies, loyalty, etc.

6. The present method of investigation and consideration of all offenses of employees will be continued, but, while reprimands and suspensions by record will be administered for a given number of days, no actual suspension will be served by an employee at fault except that when an employee's demerits have reached 90, actual

suspension may be imposed, the number of days of actual suspension to be recorded, but not in demerit record. Employees at fault shall not be paid for any time lost on account of investigations.

7. When an employee's demerits have reached the number of 90 he shall be called in by the superintendent, duly cautioned, and advised that when his number of demerits amounts to 100 he will be dismissed from the service.

8. No suspension by record will be made for a period of less than five days nor more than 45 days.

9. A perfect record will be one against which no unfavorable entry has been made.

10. A clear record will be one on which unfavorable entries have been cancelled.

11. Cautions, reprimands and suspensions by record will be charged against an employee's record as follows:

(a) A caution will be entered upon the record but will not call for a demerit.

(b) A reprimand will call for one demerit.

(c) Suspensions: The demerits will in each case equal the number of days of suspension.

12. Where demerits are given for unsatisfactory service it is logical that merits should be given for good service, and cancellations upon record will be given as below:

First.—A clear record for one year will cancel six demerits.

Second.—A clear record for two consecutive years will cancel 18 demerits.

Third.—A clear record for three consecutive years will cancel 40 demerits.

Fourth.—A clear record for four consecutive years will cancel 75 demerits.

Fifth.—A clear record for five consecutive years will equal a clear record.

13. Dishonesty, desertion, immorality, gross carelessness, intoxication, insubordination, incivility, wilful negligence, incompetency or disobedience of the company's rules will be considered sufficient cause for dismissal.

14. All employees affected by this system of discipline shall start on an even basis, that is, without merits or demerits.

15. Subordinate officers will see that information necessary to the proper keeping of the record of each individual affected is promptly forwarded through the proper channel to the superintendent.

New Railroad Laws in Illinois.

Railroad legislation in the forty-fourth Illinois general assembly began with the introduction of a number of radical bills and ended with the passage of two which may be looked upon as conservative in that they aim only to apply the Federal safety appliance laws to railroads not under Federal jurisdiction. One of the bills requires that all cars used in the state be equipped with power brakes, automatic couplers and grab irons. The other provides for the appointment of a state inspector of safety appliances with authority to enforce the law requiring the appliances. Both become effective July 1. When the session of the legislature opened the legislative committee of the Brotherhood of Firemen had four measures upon which it was insistent, being a bill abolishing the fellow servant doctrine of English common law as applied in Illinois, the "full crew" bill, a measure known as the "rest" bill providing that no trainman should be worked longer than 16 hours continuously, and the safety appliance bill. The fellow servant bill as first drafted applied to railroad employees alone, but the state miners' organization, the State Federation of Labor and the Chicago Federation of

Labor took a hand, and the bill was broadened to include all workmen "engaged in hazardous occupations." In this shape it was reported out of the house judiciary committee after the labor lobby had spent two months of hard work to secure favorable action, but it was used merely as a club to aid in passing the other bills wanted by the labor lobby. The full crew bill and the "rest" bill could have been passed in the House but the Senate blocked them.

There was the usual lot of radical proposals. One of these was to fix all passenger fares at two cents a mile and another aimed

shown in Fig. 2 is made by the W. P. Davis Machine Company, Rochester, N. Y. With the triple gear it has a driving power of 68 to 1 and can be used with belt drive, also with back gear or triple gear. The cone has five steps, making 15 changes of spindle speed. The compound rest has power feed in every direction. The tailstock is cut away, allowing the compound rest to be swung around close to the tailstock. The feed is arranged to reverse in the apron and a quick change is procured by a feed lever on the front of the headstock so that four changes can be made instantly. The feed changes

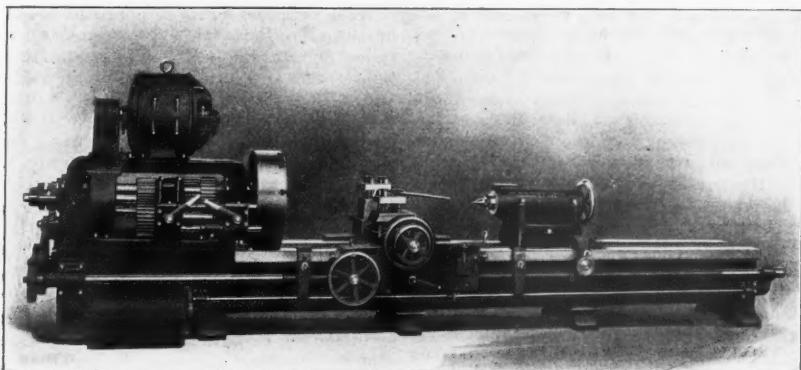


Fig. 1—The Pond 30-in. Rapid Reduction Lathe.

to make railroads pay a per diem penalty for delays in transporting freight.

Railroad Shop Tools.

(Continued.)

LATHES.

The accompanying illustration, Fig. 1, shows a 30-in. rapid reduction lathe made by the Pond works of the Niles-Bement-Pond Company. This machine is especially designed for the heaviest of roughing work, and, as shown in the illustration, it is fitted with a 25 h.p. variable speed motor which, by means of gearing, gives 30 changes of speed to the spindle; thus, cutting speeds from a minimum of 50 f.p.m. on 16-in. diameters to a maximum of 200 f.p.m. on a 2-in. diameter can be obtained. The machine will swing 16 in. over the carriage, and when fitted with a 12-ft. 6-in. bed will turn 4 ft. between centers. Both spindles are of hammered steel and all rotating shafts in the headstock are mounted in ring self-oiling bearings provided with bronze bushings. By means of a handle on the carriage which is at all times within easy reach of the operator the lathe may be started, stopped, or reversed. Any of the various motor speeds may also be obtained by this handle. The mechanism is arranged so that it is impossible to have more than one speed engaged at the same time. The tail stock has a graduated set over for turning tapers, and is adjusted by means of gearing which engages in the steel feed rack. The bed is sufficiently wide to prevent the tool slides from overhanging when turning the largest diameters. The carriage has long bearings upon wide tracks and is gibbed to the outside edge of the bed. It is provided with rapid hand traverse by gearing and can be clamped in position when it is used for cross feeding. Front and back tool-slides are provided on the carriage. These may be adjusted separately or together. The tool slide is fitted with independent lateral adjustment. Both the carriage and tool slides are arranged so as to catch the lubricant and to return it to a tank from which it is delivered to the tools by a pump of large capacity.

The 36-in. triple geared engine lathe

can be made while the lathe is cutting and by using the quick change for feed a change can also be made for thread cutting. The spindle has thrust bearing on its end. The carriage is arranged so the compound rest can be fed out 7 in. beyond the face of the carriage, thus getting the full benefit of the swing of the lathe. This machine can be furnished with any length of bed required and the gearing in the head block is cased, although not shown in the cut. The principal dimensions of this lathe are as follows: The front bearing is 11 in. long by 6½ in. in diameter; the back gearing is 8½ in. long by 5 in. in diameter, and the hole through the spindle is 3½ in. The diameter of the tail spindle is 4½ in.; the swing over

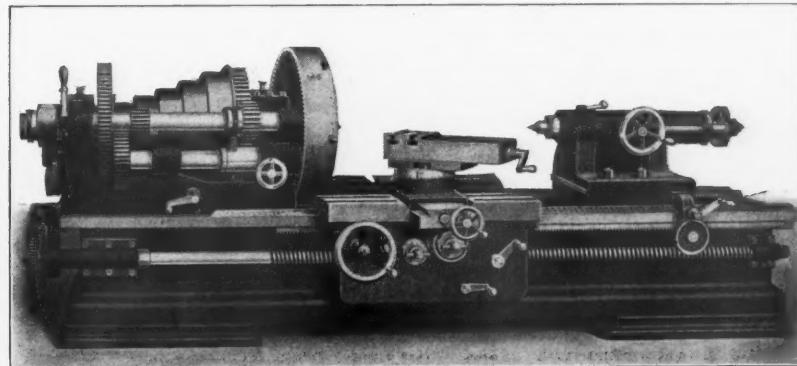


Fig. 2—The Davis 36-in. Triple-Geared Engine Lathe.

the ways is 37 in. and the swing over the carriage is 25 in. The distance between centers on a 14-ft. bed is 76 in. The machine is fitted with power cross feed and the compound rest is arranged to feed in any direction. The ratio of the back gearing is 12 to 1, and the ratio of the triple gearing is 68 to 1. Provision is made for cutting threads from 1 in 5 in. to 16 threads to the inch. The cone has five steps ranging from 9½ to 24 in. in diameter for a 5-in. belt. The friction pulleys on the countershaft are 24 x 7½ in. and should run at 150 revolutions per minute. The weight of this machine with a 14-ft. bed is about 18,000 lbs.

(To be continued.)

May Railroad Decisions.

The following cases, involving the application of the law to railroad operation and interests, were decided by the Federal courts during May:

Assumption of risk.—A railroad employee will be regarded as having assumed the risk of danger from employment of incompetent help where he is an experienced employee and continues to work with men known by him to be incompetent, without protest. *Hull vs. Northern Pacific Ry. Co.*, 136 Fed. Rep. 57.

Modification of tax assessment.—The Board of Railroad Commissioners of Arkansas charged with the duty of assessing railroad property is a continuous body and, having made an assessment, is not without power afterwards to convene and modify the same for the purpose of compromising litigation. *Railroad Tax Cases*, 136 Fed. Rep. 233.

Grant of right of way by city.—A grant by a city to a railroad company to lay its tracks to and upon a public wharf is for a public use and within the power of the city. *Murray vs. City of Allegheny*, 136 Fed. Rep. 57.

Train despatcher a vice-principal.—A train despatcher is a vice-principal and not a fellow servant of the engineer of a train running under his orders, and the railroad company is liable for injuries received by the engineer as a result of the negligence of the despatcher in the performance of his duties. *Santa Fe Pacific Railway Co. vs. Holmes*, 136 Fed. Rep. 66.

Federal jurisdiction in condemnation proceedings.—An order of the Federal Court requiring a suit against the receiver of a railroad appointed by such court to condemn a crossing over the right of way to be brought in the Federal Court, does not constitute an interference with the state in the exercise of its rights of eminent domain. *Buckhannon & Northern Ry. Co. vs. Davis*, 135 Fed. Rep. 707.

Liability of right of way to paving assessments.—The fact that the only use made of a lot abutting on a street improvement is for a railroad right of way does not preclude

the idea of benefits from the improvements so as to relieve such property from liability to assessment. *Louisville & Nashville R. R. Co. vs. Barber Asphalt Paving Co. (U. S. Sup.)*, 25 Sup. Ct., Rep. 466.

Liability of railroad for act of agent.—A railroad company is not liable for the act of a station agent in killing a patron where acting clearly beyond the scope of his duties. Thus where the deceased having called at the railroad station to inquire of the agent as to whether any demurrage would be charged on account of his failure to unload a car of coal that day was assured in the negative and was called back by the agent who shot him while signing a book

at his request, it was held that the widow could not recover damages against the railroad company for the wanton act of the agent. *Brown vs. Illinois Central R. R. Co.*, 136 Fed. Rep. 306.

Proof of violation of law against consolidation of competing lines.—A clear preponderance of evidence is essential to establish a contention that the parties to a transaction by which a corporation formed for the purpose, acquired, in exchange for its own capital stock, a controlling interest in the capital stock of two competing interstate railroad companies, pursuant to a combination of the stockholders in those companies, agreed that the new corporation should hold such stock as trustee for the railroad stockholder, where the transaction on its face is one of plain purchase and sale. *Harriman vs. Northern Securities Co.* (U. S. Sup.), 25 Sup. Ct., Rep. 493.

Exemption from taxation.—A special act of the legislature of a state exempting a railroad company from state, county and municipal taxation creates a contract between the state and the company which is impaired by a levy on the property by local taxing officers within the federal constitutional provisions against the impairment of contracts. The exemption is strictly limited to the road built under the charter and cannot be extended to other lines built or acquired by the railroad company. *Wilcomico County vs. Bancroft*, 135 Fed. Rep. 977.

The Yetman Telegraph Transmitter.

The paper by Mr. C. E. Yetman, read before the New York Railroad Club, describing his machine, was reported in the *Railroad Gazette* of May 26. In delivering his address Mr. Yetman showed a number of stereopticon views illustrating practice in railroad telegraph offices. He says that there are now seven train despatchers who use his machine for sending train orders, making their own copy on the typewriter (in the sending machine) at the same time, by the same operation. Replying to the suggestion that a sending machine would be too costly for a small office, Mr. Yetman cited an instance in his own early experience at a station where he had to work two days and two nights sending messages which were occasioned by a collision near that station; a sending machine, making the work easy instead of hard, would have been a great benefit both to the operator and to the people interested in the messages. By making work easy and by making good senders out of poor ones he has enabled many young men to increase their salaries from \$10 to \$20 a week. Mr. Yetman says that there are 150,000 telegraph offices in the United States, over one-third of the number being classed as commercial offices.

Mr. C. S. Rhoads, Superintendent of Telegraph of the Cleveland, Cincinnati, Chicago & St. Louis, took part in the discussion and related interesting early experiences. Being an "old timer," he was reluctant to give up hand sending, because of the human touch, which is such a satisfying element to the telegraph operator with human sympathies. Mr. Rhoads recently called up an operator who had not heard him at the key for over 12 years, yet was recognized at once.

Mr. N. E. Smith, Superintendent of Telegraph of the New York, New Haven & Hartford, said that the Yetman machines were doing fine work on his road. An operator can work all day sending at good speed and yet feel fresh and rested at the end of the day, and willing to work extra if needed. One young man who had had trouble with his hand and contemplated resigning bought

a machine and now not only does good work but his hand has recovered.

Mr. Angus Sinclair electrified the meeting by saying that he had seen more of the evolution of the telegraph than any of the rest of them, for he was an operator on the double needle telegraph in Scotland years ago.

Maintenance of Air-Brake Hose.

At the recent meeting of the Air-Brake Association Mr. Robert Burgess in a paper on the maintenance of air-brake hose quoted some interesting figures taken from the store-keeper's records on a large railroad owning about 25,000 cars. The cost of maintaining the hose on these cars for one year was, in round numbers, \$30,000. This figure is probably much higher than the average and an analysis of the itemized records is therefore of particular interest as showing where the careless or extravagant practices can be traced. During the year 27,600 hose were bought and fitted up complete. But during the same period only 19,750 coupling gaskets were bought. Manifestly, therefore, not only were a large number of new hose sent out with old gaskets but the number of gaskets issued to repairmen must have been very limited. The result was that the trainmen and repairmen were encouraged to wedge up the couplings to keep them tight with the old gaskets and in consequence of this bad practice a large number of hose and angle-cocks were torn off and damaged. By attempting to save gaskets that cost four cents, hose costing 75 cents were destroyed.

More than 6,500 new couplings were bought, showing that of the total number of hose fitted up, about 25 per cent. of the couplings were either lost or so badly damaged as to render them useless. Over 12,000 hose nipples were ordered which would indicate that when a hose was torn off only the larger end was returned for refitting. Hose clamps to the number of 37,000 were also bought, showing that the repairmen in remounting hose almost invariably threw away the old clamps. Another interesting feature of the investigation which was made in this case was the ignorance shown regarding the storage of hose. Most of the store keepers were under the impression that the hose should be kept in a dry atmosphere, and in most places it was stored in the upper part of the storehouse. A large number of porous and cracked hose was the natural result.

Timber Trestles.

At the last annual convention of the American Railway Engineering and Maintenance of Way Association, Mr. A. F. Robinson, Bridge Engineer of the Atchison, Topeka & Santa Fe, presented a paper on the standard trestle plans recently adopted by that road. This paper was reprinted almost in full in the *Railroad Gazette*, Aug. 12, 1904. In the December Bulletin of the association, Mr. Hunter McDonald, Chief Engineer, N. C. & St. L., contributed an interesting discussion on some of the details of the designs presented by Mr. Robinson. Taking up the details in the order in which they were treated in the original paper, Mr. McDonald offers the following criticisms and suggestions:

Guard Rails.—In the design shown in the paper these are confined to place by bolts running only through the tie. There appears to be no necessity for placing the guard rail so far from the running rail. Twelve inches between rail and guard rail is sufficient. By this arrangement the guard rail can be bolted through the stringer, a more economical and stable arrangement.

This, however, would penetrate the galvanized iron cover of the chords, which is to be avoided. It is very difficult to keep these short bolts, running through guard rail and tie only, tight, and their rattling under passing trains is a constant reminder that you are passing over a trestle. When these are used, it would be preferable to bolt every tie and dispense altogether with the dapping of the guard rail. The writer knows of one large system where this plan is followed and the results are reported as satisfactory, no bunching of ties nor failure of guard rail under derailed trains having occurred. Dapping the guard rail has the following objections: In addition to those mentioned by Mr. Robinson, it is expensive and unless the ties are of absolutely uniform width, the guard rails are useless when once taken off from their first bed. The writer prefers the guard rail dapped over every tie, spaced 12 in. from the running rail, bolted through the stringers at two points in every span and spiked with 10-in. boat spikes into every tie. The lap joint is no more difficult to make than the dapping; and when bolted with one bolt, it is far superior to the butt joint, as it will not raise up.

Ties.—When the chords are placed directly under the rail, there seems to be no necessity for making the ties thicker than the plans shown in the paper. The writer, however, believes that the stringers should be spaced at least as far apart as the distance between the bases of the rail. This is for the prevention of fire dropping from the ash pans on to the stringer. His practice in the past has demonstrated many times the wisdom of this plan, where the stringers are not covered with galvanized iron. Of course, this requires a heavier tie to properly transmit the load from the rail to the stringer. Some recent experiments made by the writer on the deflection of stringers gave the following results: The ties are of white oak 8 in. wide, 9 in. deep (sized to 8 1/4 in.), 10 ft. long, spaced 1 ft. 4 in. c. to c., spans 12 ft. between centers of caps, two 8 x 16-in. stringers on each side, packed 1 in. apart, chords 6 ft. apart inside, supported by corbels 5 ft. long. Under a 10-wheel passenger engine with 13-ft. rigid wheel base and 117,000 lbs. on three driving axles, running at high speed, the average deflections were, for inside member of chord .283 in., for outside member .20 in. On three-ply chords, no corbels, inside member directly under the rail, all other conditions same as above, the average deflection was, inside member .183 in., middle member .166 in., outside member .133 in. The writer believes that the combined advantages of bolting the guard rail through the stringer and the protection against fire, fully justify the use of the heavier tie. Where galvanized iron is successfully used, no protection against fire is necessary and the closing up of the chords and the use of the lighter tie is probably justifiable, but on economical grounds only.

Stringers.—Regarding the cross-section of stringers, the writer believes 8 x 16 is in more common use than 7 x 16. A log that will make a 7 x 16 stringer will make an 8 x 16 stringer just as easily. Larger sizes than these, except out of Oregon or Douglas fir, are very difficult to secure. It has not been altogether the writer's experience that the quality of the timber decreases with the size. There is a strong tendency among the mill men to saw the largest stick possible out of the smallest log. It seems that the Santa Fe has not taken into consideration the rough riding of trestles on account of deflection of stringers. A stringer whose extreme fiber is strained to 2,000 lbs. would necessarily cause very rough riding at high speed and the continually recurring deflec-

tions between caps and rigid bearings on the caps are not only very hard on the machinery, but also on the trestle itself. It does not seem desirable that any stringers

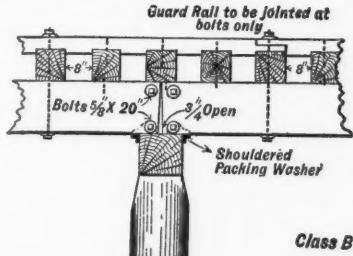


Fig. 1—Chord and Guard Rail Joints.

at all should break under traffic; they should fail by decay only, and the writer cannot agree with Mr. Robinson in his assumption that so long as the percentage of broken stringers is small, we are reasonably secure.

Bents.—The writer does not believe that one bent carrying the common traffic of to-day should consist of less than six piles, and thinks that the piles should be spaced as closely as possible under the stringer. This can always be done where trestles are high enough to admit of piles being pulled after driving, but is not possible in low trestles. A single cap is not sufficient to distribute the load uniformly between all of the piles when spaced widely apart. The writer has seen the four outside piles in a five-pile bent settle, leaving the cap rocking on the middle pile, and similarly the two inside piles in a four-pile bent settle, leaving the outside piles to carry the weight. It has been his practice to use red cedar piles, which have a very long life, but do not stand the punishment in driving that oak does. With strong oak piles properly driven there is probably no need for six-pile bents, but with treated pine, chestnut, cypress and such softer woods, four piles are not sufficient. It is very desirable to so space the piles that they can be driven without moving the stringers in rebuilding, but in low trestles this is done at the sacrifice of uniform distribution of the load on the piles.

Galvanized Iron.—The writer notes the use of galvanized iron on the stringers and caps in the Santa Fe plans. He knows of instances where stringers covered with No. 16 galvanized iron in 1880 have only recently been removed from the track. The cause of their removal was not so much that the stringers were decayed, but that they were too light for the traffic. He recently examined a large number of these stringers and found dangerous decay in only a very few of them. The galvanized iron, however, on these stringers was not properly taken care of. After being once put in it was allowed to take care of itself, and not being securely fastened in position, it crept, in some places leaving the stringers altogether and in others shifting both endways and sideways. When holes developed, on account of rust and from other causes, no effort was made to repair them. The writer has had in use, on the N. C. & St. L., intermediate caps of double-deck trestles and caps of timber piers under girders, covered with No. 22 galvanized iron since 1887, and the timber under all of them is in good condition to-day and

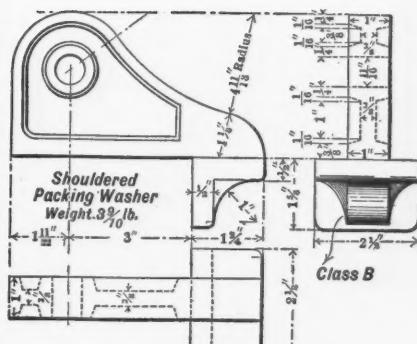


Fig. 2.

tie and the galvanized iron. The failure of the iron has taken place between the ties and not under them. Recently a heavily coated refined bloom iron has been secured, the life of which will probably far exceed that formerly used. A careful watch is kept of these stringer covers and whenever they show signs of leaks, which are visible by rust stains on the sides of the timber, investigation is made and the cause remedied. Perforations in the iron are of little consequence, provided they are made in the proper way. They should be made with a square cut tool working upward through the iron into a hole bored in the wood, which plan raises the edges of the hole so that water collecting on the metal will not find its way through the holes. In order to accomplish this the dowels are driven into the stringer, the ties jacked up, the iron slipped under them and the ties lowered. Sheared dowels will not accomplish this result. They must be cut into 10-in. lengths in the lathe and then sheared into 5-in. lengths, the sheared end being driven into the stringer. There is absolutely no movement or creeping of the iron when put on in this manner. The cost of covering the stringers and caps is about 50 cents per foot of bridge, and even if it lasted only four years, it is much cheaper to renew the iron every four years than it is to renew the timber every eight. As a precaution against decay and fire, the galvanized iron is more economical and better than using treated timber. In the writer's opinion the stringers should be confined to position laterally by means of planks spiked on top of the cap and sheltered under the galvanized iron, the ends of which are turned up and fastened to the side of the stringer. They should be confined to position longitudinally by a packing washer specially made with a shoulder which engages the cap and is held in place by a packing bolt. (See Figs. 1 to 3 showing washer and method of use.) Where it is necessary to anchor the stringers down, on account of high water, this same washer by a slight change in form can be used as a means of fastening the anchor bolt, thus avoiding altogether any perforation of the iron cover.

Bracing.—The use of forked or crotched bracing does not seem to be in keeping with the aim to confine the character of work to the quality of the men that can be secured to perform it. The cutting and framing of these braces is a very delicate operation if a tight fit is wanted, which is necessary in order for the braces to be effective. While it is quite true that the 3 x 10-in. plank, bolted and spiked on, is not what one would desire, it will prove all right when some economical method of fastening it to the timber is secured, which will develop its full strength. The writer has had no experience with the use of ballasted trestles, but a floor composed altogether of stringers does not seem desirable, both on account of its

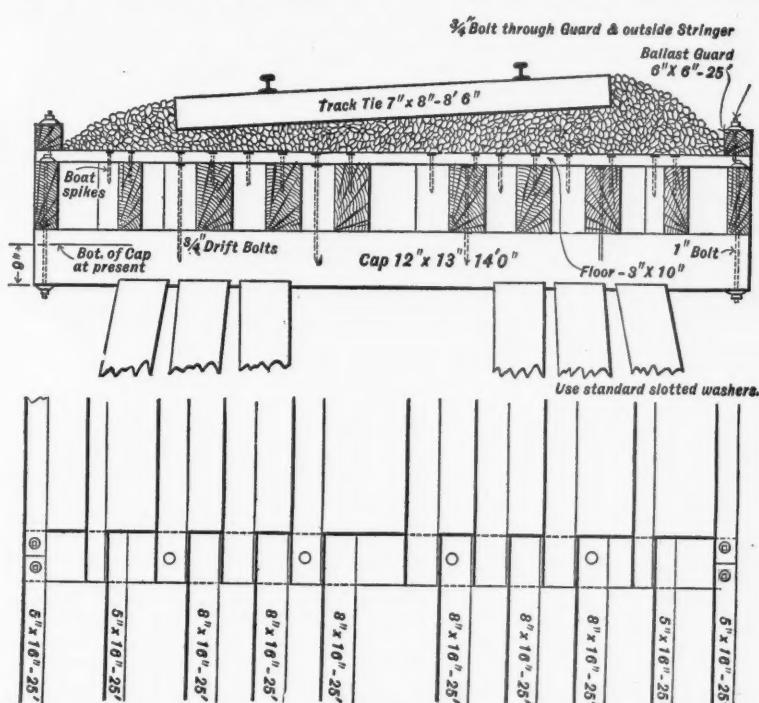


Fig. 4—Ballast Floor for Trestle, N. C. & St. L.

expense and the difficulty of repairing both the piles and the deck. A cross-section of the writer's design of ballasted trestle floor is shown in Fig. 4.

Rate-Making in France.*

In France the railroads are not owned by the Government, but railroad rates are fixed by governmental authority. The maximum charges which the railroads of France may make for carrying merchandise are fixed by a contract made by each company with the Government, this contract being in effect the company's charter. The Government designates the exact course along which a road shall be built, in some cases laying it through territory which would not be profitable for private management to operate in without some sort of subvention.

This subvention the state gives in the form of an advance or loan, on which the company must pay 4 per cent. interest and which must be returned within a specified period. During that period the company may not declare dividends above a fixed figure, the surplus that might otherwise go to dividends being used in reducing the loan.

At the end of the specified term, usually 99 years, the railroad becomes the property of the state outright, except for its rolling stock. This makes possible the building of railroads in places where the Government restrictions would otherwise make it impossible. The taxpayer pays for all these things.

There is no provision at all for the state's regulating charges for water transportation. The waterways are, in the eye of the law, public highways. The vessel owner may charge as much as he pleases for the services he gives, and, inasmuch as it costs him much less than like service costs the railroad, he can depress his rates and raise them with impunity, so as seriously to affect the trend and movement of traffic.

In the region north of Paris, which is the great industrial section of France, a very large proportion of the traffic is carried by canals. In southern France a very large share of the freight between Marseilles and Paris, for example, moving in either direction, goes around the coast line instead of directly by rail.

The Government will not allow the making of railroad rates that will take the traffic off the canals, and its refusal to allow this is due to political pressure sometimes, to the jealousy of one community toward another, to the powerful influence of the vessel owners to whom the present arrangement is of such vast financial benefit, to the difficulty of ever getting a governmental machine to reverse its action or to modify its mechanical methods.

The inelasticity that government ownership or close government supervision invariably brings makes it impossible that French railroad rates should go below the point at which the boats on the waterways do business.

Not only does the Government never give its consent to the raising of rates, as might be expected, but it frequently withholds its consent from lowering them. Our only protection is that our contracts with the Government have fixed maximum charges so long as the present agreements are in force.

We would be only too glad to adopt the American system of fixing the lowest rates proper and making up the loss of profit on each shipment out of the increased volume of business they make the railroads available to, which is the only economically and commercially right and sensible way of

doing. We would be glad to build up our territory as the American railroads do, by encouraging its industries, by opening its markets, by enabling it to compete with other territory contributing to the same markets.

But we cannot do that. The state controlled rates prevent it, however strong our desire or the people's may be.

The basis on which freight rates are made in France is generally that of distance. In fact, it is impossible that any Government or Government commission should make rates on any other basis.

This tape measure basis is the easiest to defend against charges of discrimination, in spite of its real injustice and its absolutely unsound economy, which a moment's thought will show. It avoids trouble and affords excuses, and your Government official's chief thought is to avoid trouble for himself, for he is first, last and all the time a politician.

Railroads under Government supervision must set their rates close to the maximum, and maintain them there, for their own salvation. There are many times when if it were possible we would like to lower freight charges to meet some special emergency, such as the necessities of a district suffering from a crop failure, for example.

That is not philanthropy, but commercial sense, to help the man who creates business for you, when he is hard pressed, and to increase the volume of traffic that is falling because people have not the money to pay the price they have been accustomed to pay easily. But if we should once lower our rates—possibly to the point of loss, as American railroads have done frequently in crises—we would not be allowed to restore them later, when they should fairly be restored.

Occasionally, temporary rates are made for the term of a year say, but it is quite exceptional. And why, do you suppose? Because the process of reducing rates under our system of Government regulation, which is as liberal as any European system of the kind, involves so many hearings, discussions and disputes by rival boards of trade and chambers of commerce, deputies, politicians, shippers and the rest of them, that it takes many months and sometimes years to get permission to make a reduction in charges.

By that time the necessity for which the reduction was asked is passed; it will do neither the railroad nor the community any good; and so we do not ask for such things.

It may seem curious to Americans, but no reduction of rates has ever been made in France to meet the needs of the railroads, however much they might want it. A striking instance of how Government regulation works in this particular is the experience of my own road in common with others a few years ago, when the phylloxera attacked the vineyards of southern France.

There was no wine making to speak of in France then, and the country's supply was imported from Spain. Wine is a staple, a necessity of the poor man as well as the rich, and we made a low rate for bringing it from Spain into Paris.

The deputies of the vineyard districts protested, however, because they said we were carrying Spanish wine as cheaply as we were carrying French wine. The railroads were obliged to restore the high rate, and immediately the wine went to Paris from Spain by water, through the canals and canalized rivers.

In order to make this water transportation easier, the Government made large extra appropriations for the canalization of the Seine at that time. The citizen whose temporarily non-existent industry was being "protected," partly for the benefit of foreign ship owners, it would appear, was, as a

taxpayer, contributing his francs for this canal construction and repair when he could least afford it.

As I have told you, our charges for transporting freight are fixed in the railroad's original contract with the Government, and set down in the tariff sheet. For obvious reasons, the railroads never have consented to give the state the right to lower these maximum charges, nor can it be expected that they ever will consent to such a thing.

Our contract with the Government is like any other contract; it cannot be altered except with the consent of both parties. Any form of government supervision short of absolute government ownership must be based on contracts of that kind, otherwise what protection would there be for the vested interests?

Petitions for lower rates are made to the Director of Railways from time to time, and perhaps he will suggest the desirability of considering some of them, but he has no power to enforce such demands. Of course, sometimes we must yield to such petitions against our better judgment, when they are evidently nothing less than sectional selfishness. The pressure which any Government can bring to bear is tremendous, and may not be withstood in certain circumstances, even though it may threaten industrial misfortune.

Any economist, any business man, any transportation manager will tell you that the present American method of fixing freight rates is the only logical and rational one.

Foreign Railroad Notes.

Siam now has about 280 miles of railroad and has recently borrowed \$5,000,000 in London to extend the lines.

The railroad bridge over the Zambezi river at Victoria Falls was completed on April 1. It is a cantilever bridge and the deck is 420 ft. above the river, which makes it probably the highest bridge of its size in the world.

Of the three railroads in Scotland, the Caledonian, the Glasgow & South Western and the North British, only the first has been able to maintain its usual dividends for the year. Both of the others reduced dividends $\frac{1}{4}$ per cent. owing to reduced gross earnings.

The so-called "light railways" of Belgium are being rapidly extended throughout the country. They are built largely from Government funds but are operated by a private company, the Société Nationale des Chemins de Fer Vicinaux. At the end of 1903 more than 1,900 miles of road were in operation, and there were under consideration applications for 117 other lines having an aggregate mileage of nearly 1,200 miles. With the exception of about 50 miles all of these lines are worked by steam. They are mostly single track of 1 meter gage, and are built along the road sides between outlying villages and towns not on the main line railroads. Some of the lines carry only passengers, and these are mostly operated by electricity, the other lines carrying freight as well as passenger, being worked with light steam locomotives. For the year 1903 the ratio of operating expenses to gross earnings on the lines carrying passengers only was 73 per cent, and on the lines carrying freight was 67.5 per cent. The average cost of building and equipping such roads for steam operation is about \$17,000 per mile, and for electric traction about \$50,000 per mile.

*Emile Heurteau, President Orleans Railway, in interview at Washington.





GENERAL NEWS SECTION

NOTES.

At Columbus, Ohio, on May 22, six men were killed by the explosion of the boiler of a locomotive at the Hocking Valley roundhouse. The engine had just been rebuilt and was being tested.

The Atchison, Topeka & Santa Fe is to renumber all of its locomotives so as to have the number indicate the class and capacity of the engine. The New York, New Haven & Hartford has lately made this change in its engine numbers.

The Illinois Central has announced the very low rate of \$5 for round trip tickets from Omaha to Chicago, beginning June 18. This is the result of sharp competition for the patronage of delegates to the annual convention of the Modern Woodmen of America, which is to be held in Milwaukee.

The Legislature of Florida has passed a "Jim Crow" car law applying the separate car rule to street railways. In single cars there must be a screen or other device, but apparently there is provision for keeping white and black passengers separated each from the other in cars which have no partition or screen.

On application of a cattle dealers' association the Railway Commission of Canada has ordered a reduction in rates on live stock from all parts of upper Canada to Montreal. The rate per 100 lbs. from Windsor is to be 23.5 cents; from St. Thomas, 22 cents; from Hamilton, 20 cents; from Toronto, 17 cents, and from other places in proportion.

The Denver & Rio Grande announces that henceforth the requirements of the Federal automatic coupler law will be compiled with on its narrow gage lines as well as on the standard gage. Heretofore trains have been run over the three-rail track with standard gage and narrow gage vehicles mixed in the same train, adjustable coupler heads being used; and many of the narrow gage cars have hitherto had only the link and pin coupling.

Under the new railroad law of Kansas freight tariffs can be issued only by authority of the State Railroad Commission, and the traffic officers of the railroads have begun to flood the office of the commissioners with numerous new tariffs. To avoid delay in the approval of tariffs the Commission has decided to allow the railroads to distribute tariffs subject to the subsequent approval of the Board, without waiting for official approval before promulgation.

Following the agitation against the Pere Marquette Railroad for violating the Alien Labor act, the Canadian Government has ordered the Superintendent, the Master Mechanic and other officers of that road at St. Thomas and London to leave the country. The two officers named are given 24 days, and subordinate officers from four to seven days' time in which to set their houses in order. At last accounts the General Manager of the road had visited Ottawa and appealed to the Minister of Justice against the enforcement of the law; but, so far as

could be learned, the Government was determined not to modify its order.

The Pennsylvania Railroad has adopted a new form of tag for use on baggage which remains in station baggage rooms long enough to incur a charge for storage. The date and hour of arrival and the date and hour of delivery have to be recorded on the tag, and a receipt is given to the passenger. The receipt must bear stamps equivalent to the amount paid. It is said that systematizing the storage business in this way has doubled the receipts for baggage storage, and some stations have shown increases of from 500 to 1,000 per cent. The new arrangement is said to be an effective means of preventing baggage men from waiving or reducing the charges.

The serious loss of strawberries in North Carolina during the past month because of an insufficient supply of refrigerator cars has been mentioned heretofore in the *Railroad Gazette*. A press despatch from Wilmington says that the "Armour Car Lines" has undertaken to pay the losses of the shippers in a certain district for the first four days in May. A despatch from Atlanta says that the Georgia Fruit Growers' Association, having complained, or threatened to complain, to the Government authorities concerning the high charges exacted by the Armour Car Lines, has been invited by the car company to send a committee to Chicago to examine the books of the company, so as to secure convincing evidence of the reasonableness of the charges made for the use of the cars.

Express Robber Foiled.

The eastbound express train of the Northern Pacific was held up on the night of May 27 at Bearmouth, Montana, and the safe in the express car was blown open with dynamite; but Express Messenger Laub and Engineman Wilson overpowered the robber and handed him over to the officers of the law; and, according to a despatch from St. Paul, they each received the next day a reward of \$1,000. The train had just finished taking water when the robber appeared on the engine. He ordered the engine detached and run forward some distance and then compelled the engineman to go to the express car and call out the messenger. Covering these men with his revolver, the robber blew open the safe and then compelled the two men to go with him into the car. Wilson was instructed to light a match; the robber then, for a moment, withdrew his eye from Laub, who had picked up a piece of iron from the wrecked safe; Wilson immediately blew out the match and Laub knocked the outlaw unconscious; and he remained unconscious all the next day.

Government Rate-Making.

That government-made freight rates will be adjusted on a distance principle—that is, a charge of so much per mile for every ton of freight hauled, regardless of commercial conditions or requirements—may be regarded as inevitable. In several of the states rates have been fixed by direct act of the Legislature or by orders of state commissions. In most of these states the schedule of rates is

required to be on a distance basis, and in all of them the tendency has been toward distance tariffs. Human nature is so constituted that it is much more easy to solve the question of equality between towns and communities and interests by giving them all exactly the same rate per ton per mile than to attempt the difficult task of adjusting rates to the satisfaction of all. The result is that commissions which have the power to make rates find themselves constantly drifting toward distance tariffs, in the hope of avoiding the criticism of towns, cities and regions which are demanding their favor. It is now proposed to confer upon the Interstate Commerce Commission the power to make all interstate rates throughout the country. . . . Nothing but the most intricate and scientific adjustment of rates with each other, so skilfully arranged as to overcome the inequalities of distance and the disadvantages of location, has given to the great prairie states of Illinois, Iowa, Nebraska, Kansas, Wisconsin and Minnesota, or to the wheatfields of North and South Dakota, the marvelous prosperity they have attained and the position which they occupy in the markets of the world.—A. J. Earling in *Harper's Weekly*.

Isthmian Canal Commission.

General Henry L. Abbot, of Cambridge, Mass., and Isham Randolph, of Chicago, have been appointed members of the Board of Consulting Engineers of the Isthmian Canal Commission.

Freight on Massachusetts Trolley Lines.

A ruling that all street railways in the state desirous of carrying freight shall submit to the board a general description of the kind of merchandise they propose to carry has been made by the Massachusetts Railroad Commissioners. Several companies, including western Massachusetts lines, had requested unrestricted authority to carry all kinds of freight, coupled with the right to refuse merchandise when it seemed undesirable by the managements. The Commissioners hold that the roads have no authority to discriminate except in such manner as the board may direct.

Lake Superior Ore Docks.

A list of the iron-ore docks operated at Lake Superior ports, with their capacity and dimensions, has been made by Mr. R. Angst, Chief Engineer of the Duluth & Iron Range. There are 24 docks, with a total storage capacity of 1,061,226 tons of iron ore. Of this number, the United States Steel Corporation owns eight, with a storage capacity of 396,920 tons; the Chicago & North-Western owns seven, with a storage capacity of 256,150 tons, and the Great Northern, three, with a storage capacity of 168,000 tons. Five of the Chicago & North-Western docks are at Escanaba, Mich., with individual capacities of 24,000, 30,000, 33,000, 43,000 and 58,000 tons. This company's other two docks are at Ashland, Wis., with capacities of 42,000 and 26,000 tons. The five ore docks of the Duluth & Iron Range at Two Harbors, Minn., have capacities of 40,000, 42,000, 34,000, 37,000 and 36,000 tons. The other three docks belonging to the United States Steel Corporation

are those of the Duluth, Missabe & Northern at Duluth, which are of 58,000, 69,000 and 81,000 tons capacity. The Great Northern's three docks at Superior have a capacity of 40,000, 88,000 and 40,000 tons respectively. The Chicago, Milwaukee & St. Paul's ore dock at Escanaba, Wis., has a capacity of 50,400 tons. The Duluth, South Shore & Atlantic has two docks at Marquette, Mich., with capacities respectively of 27,000 and 28,000 tons. The Wisconsin Central's dock at Ashland, Wis., has a capacity of 48,356 tons, and the Lake Superior & Ishpeming's dock at Marquette, Mich., a capacity of 36,000 tons. The Algoma Central & Hudson Bay also has an ore dock at Michipicoten, Ont. During 1904 the Chicago & North-Western carried more ore than any other railroad, but not as much as the combined railroads owned by the United States Steel Corporation.

The Cudworth Collision.

The disastrous rear collision of passenger trains on the Midland Railway of England at Cudworth on January 19 has already been referred to in the *Railroad Gazette*. In this collision, which occurred about 3 o'clock in the morning during a dense fog, five passengers and two trainmen were killed or fatally injured and 17 other persons were hurt. The report of Major Pringle, just issued, gives details of the cause which are of interest as showing the complicated nature of the problem of providing complete safety when running trains at high speed in times of dense fog.

Two southbound passenger trains, called the up mail and the up express, were scheduled about 40 minutes apart; the engineman of the first train, the up mail, carefully obeyed the rule to slacken speed so as to make sure that he could get the indications of the signals, while the engineman of the up express disregarded this rule and caused the collision. The express had two engines, but the runner of the second engine excused himself by throwing the responsibility on the first one. The inspector's summary of facts and his principal conclusions are given in the following paragraphs.

First, there is a general rule in England, which, however, was not in force on this road, requiring that when a fog exists and the fog signalmen have not reached their posts, the block signalmen must keep trains two block sections apart. The driver of the express, Mugg, passed eight distant signals which were against him, and six home signals. Mugg stood on the right-hand side of the foot-plate, but the signals were on the left-hand side and he depended upon his fireman to sight them. He does not claim to have lost his bearings; but does claim that when he passed the critical distant signal he received a hand signal from his fireman, Pattison, intimating that he had seen the signal light and that it was at safety. Hearing no torpedoes, he assumed that Pattison was right, and therefore he did not reduce speed. He was running 50 miles an hour. Pattison was killed, so Mugg's statement cannot be corroborated. He did not see the mail train until the moment he struck it, and had not applied the brakes when the collision took place. The inspector holds, of course, that Mugg was not justified in leaving the onus for observance of signals to his fireman. He should himself have stepped to the left side of the foot-plate. He should not depend on the absence of audible stop signals but should assure himself that fog signaling was in operation, either by sighting the fog man's green lamp or hearing his voice.

The testimony of other enginemen showed that at reduced speed the signals could have been seen. The driver of the second engine of the express, Buggins, saw only two of

the 14 or more signals which were unheeded by Mugg, but these two were at safety. But he assumed that Mugg, not having his vision obscured by steam, could see all the signals. Blame attaches "in a very much less degree" to Buggins for not taking upon himself the responsibility of reducing the speed, seeing that no fog men were on duty.

The fog came on about 1.15 a.m. and over two hours were spent in getting the men to their posts. One of the signalmen telephoned to the station foreman; the foreman sent Porter Atyeo to instruct call-man Hills to order out the fog men. Hills was sick and Atyeo returned to the station for instructions. He then went for the ganger, who, not knowing the addresses of all the fog men, instructed Kettlewell to call three men. Kettlewell, however, lost some time because he did not know the number of the house in which Blackburn resided. Blackburn was the man who should have been at the all-important up distant signal. He was called at 2.35, but, having to walk a mile and a half in a thick fog over frozen snow, he did not report for duty until 3.08. He went to the cabin and got his lamp and torpedoes and finally reached his post at 5.32, just after the up express had passed. Had it not been for the slippery surface of the roadbed he would have reached his post in time to fog the signal before the express passed.

The only censure passed on these men by the inspector is upon call-man Hills, who had not given notice of his illness.

The company is admonished that fog men ought to live in cottages on the railroad premises. Fog men for distant signals are by far the most important and should be first on the ground. If a company has no houses of its own it should rent them, if necessary, so as to keep the men near the line. There should be two call-men well acquainted with the positions of the men's dwellings. One fog man should not be required to call other fog men. Duplex torpedoes now used are not safe to leave about, but the company should have them stored where the men could get them promptly without going beyond their post to get them.

Rule 85 requires a signalman to go down himself and put torpedoes on the track if the fog man does not come on duty seasonably; but they cannot do this for distant signals, or, if very busy, for any signals, and therefore the signalmen in this case are not blamed. Still, if some of the signalmen who saw the express running too fast had telephoned far enough ahead it would have been possible to use torpedoes to prevent the collision. Major Pringle then goes on to discuss fog machines workable from the cabin, but he recognizes the need of a positive as well as a negative indication and draws no more important conclusion than that possibly the railroads have not sufficiently considered the promising inventions in this line. Finally, the further recommendation is made that where possible there should be electric communication to the fog signalmen's lodgings. While the inspector finds that the rule to keep trains two block sections apart would not have prevented this collision, he says that the rule does constitute an additional safeguard in times of fog and that if, as the Midland claims, it cannot be enforced, there is all the more need for complete fog signaling arrangements.

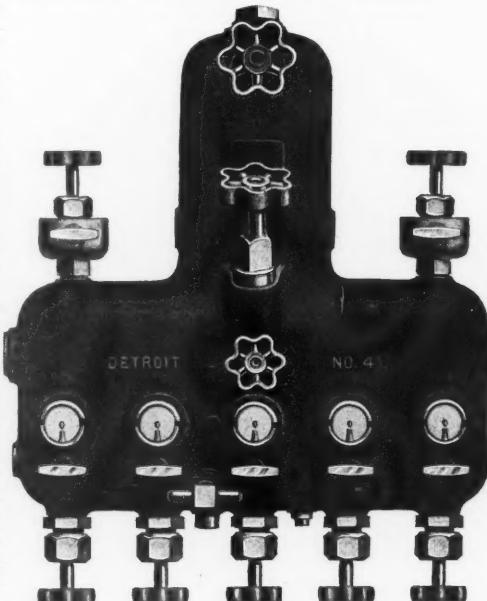
Some minutes after this collision the passenger cars took fire and most of them were burnt up, but it is impossible to decide whether the fire came from the engine fireboxes or from fusing of electric circuits, or was due to the ignition of gas.

The report on this accident affords a typical illustration of the fact that a very large percentage of English trainmen and signal-

men are men of long experience. In fact, a man of brief experience in a responsible position is almost unknown, if we may judge by the government reports. In this case the six signalmen examined by Major Pringle had been in the service of the company 23, 28, 30, 29, 23 and 13 years respectively; and they had been signalmen 16, 28, 14, 19, 19 and 5 years respectively. Engineman Mugg had been in the service 25 years and a driver 16 years. (His superintendent said that he was sober, steady and competent.) Two other enginemen had been in service 26 years and 38 years; and had been enginemen 16 years and 20 years. Four passenger guards had been in the service 30, 25, 31 and 39 years; and the last one of these, who had been a guard 35 years, was running in a train which began its trip at 11 p.m. Those veteran signalmen, also, were on night duty; but their tour of duty was only eight hours.

The Detroit Five-Feed Locomotive Lubricator.

The Detroit Lubricator Co., Detroit, is the maker of a new type of lubricator known as the Detroit No. 41 five-feed locomotive lubricator, which is illustrated herewith. It is of the bull's-eye pattern and is especially



Detroit Five-Feed Locomotive Lubricator.

adapted for use on balanced compound locomotives. It performs the same services as has been done by two lubricators (one double-feed and one single-feed) in the past, and it takes up much less space in the cab. The feeds can be arranged to feed against either high or low-pressure as may be desired.

Canadian Trans-Continental Report.

The first report of the National Trans-Continental Railway Commission presented to the Dominion Parliament May 22 covers the period from the appointment of the commission to March 31st. The commission has paid out \$440,460, and incurred liabilities of \$175,760, thus exceeding the appropriation of \$500,000 for the first year's operation by \$116,221. The commission asks an appropriation of \$1,328,500 and suggests a further vote of \$3,000,000 to begin letting contracts during the current twelve month. The surveys show that the line through New Brunswick can be built with a maximum grade for eastbound traffic of .4 per cent. and for westbound traffic of .6 per cent. It can be built 90 miles shorter than the Intercolonial, at a cost of \$33,000 per mile. From the Quebec bridge westward to Lake

Waymontachene, a distance of 423 miles, a maximum grade can be secured of .4 per cent. going east and .6 per cent. going west. This section can be built for \$30,000 per mile. On the division lying between Clear Lake and the Ontario-Quebec boundary the surveyors report there are a number of lakes and that on this account the more northerly of the two routes surveyed will be found preferable. The route between Lake Nepon and Winnipeg is said to be possible and that country contains timber in sufficient quantity to supply not only that district but the Thunder Bay branch as well. The survey made by the Grand Trunk from Winnipeg to North Bay has not been found available, as the line as now projected will run further north than contemplated in the Grand Trunk's original plans.

Use of Pintsch Gas.

The following statistics compiled by the Julius Pintsch Company, of Berlin, give a very comprehensive report of the application of Pintsch gas for lighting railroad trains, buoys and beacons throughout the world. There are now 134,855 cars, 6,191 locomotives, 1,516 buoys and beacons, equipped with this system of lighting, and 364 special gas works fitted up to manufacture and compress the gas.

Progress in the Use of the Pintsch Gas Lighting System to December 31, 1904.

	Cars.	Locomotives.	Gas works.	Buoys and beacons.
Germany	46,200	5,930	70	140
Denmark	45	..	3	21
England	20,500	..	80	280
France	8,000	..	20	250
Holland	3,800	5	12	100
Italy	1,570	..	5	20
Switzerland	410	2	1	..
Austria	5,525	..	15	5
Russia	4,000	170	22	30
Sweden	800	53	6	5
Serbia	220	..	1	..
Turkey	120	..	..	..
Bulgaria	117	..	..	..
Egypt	200	..	4	80
Canada	600	..	4	243
Brazil	1,400	31	2	45
Argentine	1,200	..	13	10
Chili	50	..	2	..
Australia	3,000	..	10	40
India	11,600	..	19	..
United States	25,200	..	71	208
Japan	150	..	2	35
China	..	..	1	25
Mexico	150	..	1	..
Total	134,855	6,191	364	1,516

Souvenir of the Illinois Central.

For the members of the International Railway Congress who, on May 19, traveled over its line from St. Louis to Chicago, the Illinois Central issued a very handsome souvenir describing the road and containing many photographs of scenes along its line. These latter include the Illinois Central's eight-track entrance along the lake front into Chicago; the home of Abraham Lincoln, and the Lincoln national monument and tomb at Springfield, Ill.; a typical section of the line with double track, 85-lb. rails, stone ballast trimmed to line, and automatic block signals; an Atlantic type passenger locomotive; the Illinois Central bridge across the Mississippi river at Dubuque, the double-track concrete bridge across the Big Muddy river near Carbondale, Ill.; a view of the prairie country through which the northern lines of the company run; the bridge across the Ohio river at Cairo, of which the bridge proper is two miles long, and the whole, including the approaches, four miles long; the bridge across the Tennessee river; and scenes in Memphis, the Mississippi country, the delta, Vicksburg, La., and New Orleans. The book is beautifully bound and printed, and is an unusually attractive souvenir.

Railroads and Democratic Government.

Elsewhere than in the United States, the transfer of great public utilities to public ownership goes steadily forward. The Italian railways are being taken over by the

state, and the municipal railways of London by the municipality. So thoroughly successful has municipal ownership proved in England that it can without reservation be said that the experimental stage there, as in Australia and in New Zealand, has been passed. That the English-speaking people of the world are able to manage great business interests through collective action, as they are able to maintain the institutions of popular government, is a demonstrated fact.

It is impossible to regard this progress with indifference. The future of democratic society depends upon it. Whatever power controls the biggest economic interests and agencies will control the political interests and the lawmaking and administrative machinery. If great economic interests must be monopolized by a small group of business men, organized in private corporations, popular government is a failure. The only workable form of government becomes minority government, by an oligarchy or a dictator, more or less limited by potential popular revolt. If the people can collectively own the great public utilities, and collectively prescribe terms of operation, the people can also maintain the reality of popular or democratic government. The signs are many and promising that democracy is destined in this big struggle to win out.—*The Independent.*

Apprentices in Grand Trunk Shops.

According to the *Montreal Star* the Grand Trunk has in its locomotive shops (five shops) several hundred apprentices, and these young men are regularly indentured, according to the customs of our grandfathers. The present apprenticeship arrangement has been in force two years and the results are said to be highly satisfactory. The company is not tied down by the labor unions and takes as many apprentices as may be deemed desirable. Apprentices are subjected to physical and mental tests, as is done on the best roads in the case of men applying for employment in other departments, and the term of each apprentice is five years. Written and oral examinations are held every year and apprentices who do not come up to the required standard are required to go back and perfect their knowledge in the branches wherein they are deficient. Prizes are given for drawings and other work, and there is enthusiastic competition.

Carnegie Research Scholarship.

At the annual meeting of the Iron and Steel Institute in London on May 11, a Carnegie research scholarship of \$500 was awarded to Henry Cook Boynton, A.B., S.M., S.D., Instructor in Metallurgy and Metallography at Harvard University. Mr. Boynton is 30 years old, and since his graduation from Harvard in 1900 has devoted much time to research work in the metallography of iron and steel. He is the third American to obtain a Carnegie research scholarship.

A Case for Mr. Prouty.

A man rode five days in a refrigerator car and had both legs frozen. He will probably receive a bill from the beef trust for icing en route.—*Puck.*

Cash and Brass.

English delegates to the Railway Congress are opposed to the check system of the American railways. It works well in the Senate.—*Washington Post.*

Summer and Winter.

The international railway congress is holding its sessions in the same city where the national railway congress meets every winter.—*Detroit Free Press.*

National Good Roads Convention.

The fifth annual convention of the National Good Roads Association will be held from June 21 to 24 at the Lewis and Clark Centennial Exposition, Portland, Ore. Saturday, June 24, is designated as "Good Roads Day" at the exposition. An official "Good Roads" special train left Chicago May 25 and will run over the Chicago & North-Western, Union Pacific, Oregon Short Line, and Oregon Railroad & Navigation Companies' lines.

Municipal Ownership in Leeds.

Leeds, a city of about 450,000 population, is an interesting example of successful municipal ownership in Great Britain. The street car department of the Leeds Corporation shows gross earnings of \$1,475,000, for the last fiscal year, an increase of \$85,000 over the previous year. The number of passengers carried was 64,223,666, an increase of 3,484,432. Of these 4,781,417 paid 1 cent fare, 50,778,052 paid 2 cents, 1,424,136 paid 3 cents, 6,150,880 paid 4 cents, and 1,089,181 paid 6 cents.

Manufacturing and Business.

McCord & Company, of Chicago, have been awarded a contract by the Baltimore & Ohio for 80,000 journal boxes for 10,000 freight cars.

The Vehicle & Implement Spring Co., Pontiac, Mich., announces that it is prepared to make all kinds of springs for car journal box lids.

Bids are wanted June 9 by the Department of Docks and Ferries at New York for building pier No. 8, East river; also pier No. 10, East river.

George M. Chandler, formerly Manager of the Cleveland office of Manning, Maxwell & Moore, has opened an office at Indianapolis, Ind., for the sale of machinery, electric cranes, etc.

Mr. Edmund G. Fisher, who, as announced last week, has been made Manager of the Chicago branch of the Interstate Engineering Co., Cleveland, Ohio, has taken an office at 706 Fisher Building.

Mr. C. J. H. Woodbury, Assistant Engineer of the American Telegraph & Telephone Co., Boston, Mass., will deliver an address to the graduating class at the Thomas S. Clarkson Memorial School of Technology at Potsdam, N. Y., on the subject, "The Engineer as an Economist."

The St. Louis Rail & Equipment Co., Lincoln Trust Building, St. Louis, has for sale a private car especially built for railroad officers' use. It has observation platforms at both ends and sleeping accommodations for six passengers and two servants. It has all modern equipment in good condition.

Bids are wanted September 1 by Charles A. Lee, Minister of Public Works of Sidney, New South Wales, for delivering all the steel and iron required by the government for a period of seven years. Particulars and other information will be supplied by Messrs. R. W. Cameron & Co., New York City.

The Falls Hollow Staybolt Co.'s exhibit at the Master Mechanics' convention will include hollow staybolt bars 10 ft. long, with various inside and outside diameters; samples of the raw material from which the staybolt iron is made, which is a mixture of Swedish and native charcoal iron, and a number of interesting test pieces, showing the fiber of the finished product.

The Godwin Construction Co. has opened an office at 60 Wall street, New York, for the

purpose of carrying on the business of contracting. It will make a specialty of foundations and concrete work and harbor improvements. Mr. Phil. H. Godwin, for several years superintendent in charge of Erie Basin, is President of the company, and Dr. Myron S. Falk, of Columbia University, has been retained as the company's engineer.

The Master Mechanics' and Master Car Builders' Associations have been set to music. The composition is a march two-step by L. V. Gustin, and the piece is copyrighted by The Philip Carey Mfg. Co., Cincinnati, Ohio. The cover bears likenesses of Presidents P. H. Peck, of the Master Mechanics' Association, and W. P. Appleyard, of the M. C. B. Association. Copies will be distributed at the Manhattan Beach conventions.

The Simplex Railway Appliance Company has just been awarded a contract for 20,000 truck bolsters, to be used under 10,000 cars to be built for the Baltimore & Ohio Railroad Company. The cars, of which these Simplex truck bolsters will form a part, are all of 40 and 62½ tons capacity, including box, coal and gondola cars. It is claimed that this order represents in money the largest order ever given to one concern for bolsters.

Bids were opened last week at the Navy Department for eight 8-in., twelve 7-in., and thirty-two 6-in. guns without mounts for the battleship New Hampshire and armored cruisers Montana and North Carolina. The bids were: For 8-in. guns, Bethlehem Steel Co., \$21,690 each; Midvale Steel Co., \$17,142 each. Seven-in. guns, Bethlehem Steel Co., \$19,999 each; Midvale Steel Co., \$14,315 each. Six-in. guns, Bethlehem Steel Co., \$12,850 each; Midvale Steel Co., \$12,283 each.

Iron and Steel.

The Philadelphia & Western, it is said, has given a contract for 4,000 tons of 85-lb. rails.

The Sault Ste. Marie Steel Works are filling an order for 100-lb. rails for the Michigan Central lines in Canada.

The Erie, it is said, has recently ordered 12,000 tons of 90-lb. rails which will be used to replace lighter rails on 100 miles of its main line.

The Pennsylvania, it is reported, has given an order to the American Bridge Co. for 3,000 tons of structural steel for use on its viaducts near Washington and along the Philadelphia, Baltimore & Washington.

The Pennsylvania, it is reported, has given a contract to the Carnegie Steel Co. for steel ties for three miles of track, and the Pittsburgh Railway Co. has given a contract to the same company for ties sufficient for five miles.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies see advertising page 24.)

Engineers' Club of Philadelphia.

At the meeting of this club to be held June 3, a paper on "A Simplex System of Concrete Piling" by Constantine Shuman, with illustrations, will be presented. An instrument called the angleometer, designed to take the place of the sextant, will be shown.

Society for the Promotion of Engineering Education.

The thirteenth annual meeting of this society will be held at Atlantic City, N. J., June 28 and 29. The meeting will be held in affiliation with the American Society for Testing Materials. The headquarters will be at Hotel Chalfonte. The membership of this

society now numbers 379, and represents 96 colleges and institutions teaching engineering.

PERSONAL.

—Mr. E. A. Miller, who has been appointed Superintendent of Motive Power of the New

of the M. C. In 1902 he went to the Missouri Pacific as Superintendent of the Missouri lines, but in a few months went to the Burlington, where he was on the staff of the Second Vice-President at Chicago. Last year he was made General Inspector of Station Service of that road, which position he has now left to become General Superintendent of the Iowa district.

—Mr. D. W. Dinan, who has been appointed Superintendent of the Pennsylvania division of the New York Central & Hudson River, was born in 1866 and began railroading at the age of 17 as agent and telegraph operator at Binnewater, N. Y., on the Wallkill Valley. In 1886 he was appointed train dispatcher on the West Shore at Kingston, N. Y. In 1900 he was transferred as Trainmaster to the Beech Creek district of the Pennsylvania division of the New York Central, and in 1901 was made Chief Train Despatcher on the division. On Oct. 1, 1904, he was made Assistant Superintendent, and on May 1, 1905, was appointed Superintendent of the division.

—Mr. H. A. Worcester, who has been appointed Assistant General Superintendent of



York, Chicago & St. Louis, began his railroad service on the Cleveland & Pittsburgh in 1865. The next year he was a machinist's apprentice on the Pittsburgh, Cincinnati, Chicago & St. Louis. In 1871, he became Assistant Foreman on the Louisville & Nashville, returning two years later to the P. C. C. & St. L. as Foreman; and in 1880 he became Roundhouse Foreman. In 1882 he was appointed Master Mechanic of the New York, Chicago & St. Louis at Conneaut, Ohio, from which position he is now promoted to be Superintendent of Motive Power, with headquarters at Cleveland.

—Mr. George T. Ross, who has been appointed General Superintendent of the Iowa



the Michigan Central, was born Nov. 16, 1862, at Albany, N. Y., and graduated from Yale University in 1884. He began railroad work in 1885 as a clerk in the Stationmaster's office at the Grand Central Station, New York. Here he remained until May 1, 1890, when he resigned from railroad service; but he soon returned and was appointed clerk in the Superintendent's office of the Lake Shore at Buffalo. In 1892 he became Assistant Trainmaster on the Jamestown & Franklin division, and in 1893 was appointed Superintendent of the Lansing division. In 1896 he went to Detroit, and in 1902 to Buffalo. On June 1, 1905, he was again transferred to Chicago, as Superintendent of the Western division; and this post he left on April 20 to become Assistant General Superintendent of the Michigan Central, with office at Detroit.

—Major John W. Johnston, formerly Vice-President of the Richmond & Danville Extension, died on May 21 at Richmond, Va. The R. & D. Extension built the Georgia Pacific, now that part of the Southern which extends from Atlanta, Ga., through Birmingham, Ala., to the Mississippi river. Major Johnston was first President of that road, and later Third Vice-President of the Richmond & Danville.

—Mr. James T. Goodwin, Foreman Boiler Maker of the Richmond Locomotive Works, was elected President of the International Railway Master Boiler Makers' Association



district of the Chicago, Burlington & Quincy, was born in 1866, at Truro, N. S. From August, 1884, to May, 1887, he was in the station and train service on the Intercolonial. In May, 1887, he went to the Minnesota & Northwestern, now a part of the Chicago Great Western. He served on that and other roads until in April, 1898, he was made trainmaster on the Eastern Railway of Minnesota. In a few months he was made Assistant Superintendent of that line, and soon after Assistant General Superintendent of the Montana Central. On July 1, 1901, he was promoted to be General Superintendent

at the recent meeting in Buffalo. Mr. Goodwin was born about 1865 and served his apprenticeship with the Illinois Central, remaining with that company until 1898. In that year he began work with the Rogers Locomotive Works at Paterson, N. J., continuing in service there until the firm dissolved partnership, since which time he has been



In the employ of the Richmond Locomotive Works as Foreman Boiler Maker.

—Mr. Henry C. Robinson, who has been appointed Superintendent of the Southern division of the Boston & Maine, was born in Winchester, Mass., in 1853, and left school in the winter of 1868 in the middle of his second year in the high school. His first railroad service was in December, 1870, on the Boston & Lowell as an apprentice in the shops. In 1872 he was transferred to the local freight office in Boston. In September, 1873, he was appointed clerk to the Superintendent of the division, serving during one summer as passenger conductor and learning telegraphy during his leisure hours. Next he was train despatcher and chief despatch-



er until Dec. 1, 1895, when he was appointed Assistant Superintendent. This position he held until his present appointment.

ELECTIONS AND APPOINTMENTS.

Atlantic & North Carolina.—R. E. L. Bunch, formerly general passenger agent of the Seaboard Air Line, has been appointed Traffic Manager, with headquarters at Goldsboro, N. C., succeeding E. A. Niel, recently appointed Traffic Manager of the Buffalo & Susquehanna.

Boston & Maine.—John Rourke has been ap-

pointed Assistant Superintendent of the Southern Division, succeeding Henry C. Robinson, now Superintendent.

Canadian Pacific.—John Sparks has been appointed Assistant General Baggage Agent with headquarters at Winnipeg, Man.

Chicago, Rock Island & Pacific.—C. S. Tewksbury has been appointed Freight Claim Agent, succeeding G. C. Arnold, resigned.

Cincinnati, Hamilton & Dayton.—J. J. Kelker, General Foreman of the Lima shops, has been appointed Master Mechanic at Dayton, Ohio, succeeding W. H. Sloat.

Cleveland, Cincinnati, Chicago & St. Louis.—W. H. Roseman, formerly General Freight and Passenger Agent of the Southern Indiana, has been appointed Assistant General Freight Agent of the Cairo division.

Colfax Northern.—Mrs. Thomas N. Hooper, President, has resigned.

Denver & Rio Grande.—D. M. Knox, who has been Mechanical Engineer of the Denver, Northwestern & Pacific, has been appointed Mechanical Engineer.

Duluth, South Shore & Atlantic.—George W. Hibbard, General Passenger Agent of the Duluth, South Shore & Atlantic and the Mineral Range, has resigned. See National of Mexico.

Flint River & Northeastern.—Thomas N. Baker has been elected President, succeeding T. D. Sale, resigned.

Fort Worth & Denver City.—D. D. Robertson has been appointed General Master Mechanic, succeeding H. C. Van Buskirk, who has lately been appointed Superintendent of Motive Power of the Colorado & Southern.

Gainesville Midland.—Samuel C. Dunlap, General Manager, has resigned to become Chief of the Bureau of Industries and Immigration of the Louisville & Nashville and the Atlantic Coast Line in Georgia, with headquarters at Atlanta.

Great Northern.—W. P. Kenney, late Assistant General Freight Agent, has been appointed Assistant to the Fourth Vice-President, with headquarters at St. Paul, Minn.

H. M. Adams, Assistant General Freight Agent of the Oregon Railroad & Navigation Co., with headquarters at Portland, Ore., has been appointed Assistant General Freight Agent of the Great Northern, with headquarters at Seattle.

Gulf, Colorado & Santa Fe.—With the absorption of the Cane Belt on July 1 Oliver Snyder, Vice-President of that road, will become Superintendent of the Galveston division of the Gulf, Colorado & Santa Fe, which will include, besides the Cane Belt, the main line from Belleville, Tex., to Virginia Point and the Houston branch.

Houston & Texas Central.—O. Rowe has been appointed Superintendent of the first division, with headquarters at Ennis, Tex., succeeding E. E. Shackford, resigned. D. Black succeeds Mr. Rowe as Assistant Superintendent of the division.

Kansas City Southern.—J. A. Edson, General Manager of the Cincinnati, Hamilton & Dayton has been elected President. The following executive committee has been elected: Herman Sieleken, Chairman; H. R. Duval, D. G. Bolsevain, Ernst Thalmann and Samuel Untermyer. Mr. Untermyer has also been appointed General Counsel.

Lake Shore & Michigan Southern.—J. M. Schoonmaker has resigned as director. Mr. Schoonmaker's successor is George F. Baker, President of the First National Bank of New York.

Mineral Range.—See Duluth, South Shore & Atlantic.

Missouri Pacific.—W. B. McLaughlin, who has been Roadmaster of the St. Louis Di-

vision of the Illinois Central, has been appointed Division Engineer on the Missouri Pacific.

J. A. Potts has been appointed Assistant Engineer of Maintenance of Way.

A. W. Jones, formerly with the New York Central & Hudson River, has been appointed Assistant Engineer in charge of the building of the White River division, with headquarters at Keener, Ark.

F. Neper has been appointed Principal Assistant Engineer of the Missouri Pacific and the St. Louis Iron Mountain & Southern.

National of Mexico.—George W. Hibbard has been appointed General Passenger Agent of the Mexican National lines, with headquarters in the City of Mexico.

New York, Chicago & St. Louis.—J. M. Schoonmaker has resigned as director.

Northern Pacific.—W. L. Kinsell, Chief Draftsman, has been appointed Mechanical Engineer, with headquarters at St. Paul.

North Shore.—George W. Heintz, Assistant General Freight and Passenger Agent, has resigned to become Traffic Manager of the United States Mining & Smelting Company.

Oregon Railroad & Navigation.—B. A. Worthington, Vice-President and General Manager of the Oregon Railroad & Navigation Company, and General Manager of the Southern Pacific lines in Oregon, Washington and Idaho, has resigned. See Wheeling & Lake Erie.

H. M. Adams, Assistant General Freight Agent, has resigned, to go to the Great Northern.

Panama.—J. H. Travis, hitherto Superintendent of Bridges and Buildings of the Missouri Pacific at Atchison, Kan., has been appointed Superintendent of Buildings and Docks of the Panama Railroad and the Panama Canal, with headquarters at Colon.

Pennsylvania.—George Gibbs, Consulting Engineer, of New York City, has been appointed Chief Engineer of Electric Traction for the Pennsylvania, the Pennsylvania, New York and Long Island, and the Pennsylvania, New Jersey & New York.

Southern Pacific.—James Agler, Manager, having resigned to accept service elsewhere, the office of manager has been abolished. W. S. Palmer has been appointed General Superintendent of the Northern District, composed of the Coast, Western and Sacramento Divisions and the Carson & Colorado, with office at San Francisco. R. H. Ingram has been appointed General Superintendent of the Southern District, composed of the Los Angeles, Tucson and San Joaquin Divisions, with office at Los Angeles, Cal. General officers now reporting to the manager will hereafter report to the vice-president and general manager. Division officers now reporting to the manager will hereafter report to the general superintendent. W. R. Scott has been appointed superintendent of the Western Division, with office at Oakland Pier, Cal. Howard V. Platt, who has been Superintendent of the Oregon Short Line at Salt Lake City, has been appointed Superintendent of the Los Angeles Division.

G. R. Cottingham, who has been Assistant Auditor, has been appointed Auditor of the Atlantic system, with office at Houston, Tex., succeeding F. S. Benson.

Wabash-Pittsburg Terminal.—See Wheeling & Lake Erie.

Wheeling & Lake Erie.—Frederic A. Delano has been elected President, succeeding Joseph Ramsey, Jr. B. A. Worthington, heretofore Vice-President and General Manager of the Oregon Railroad & Navigation Company, has been elected Vice-President of the Wheeling & Lake Erie, and of the Wabash-Pittsburg Terminal. Alvin W. Krich, President of the Equitable Trust

Company, has also been elected Vice-President of the Wheeling & Lake Erie.

LOCOMOTIVE BUILDING.

The Erie is reported to have ordered 16 additional Pacific type (4-6-2) locomotives from the American Locomotive Co.

The Canadian Pacific is reported to be building three Pacific type (4-6-2) locomotives at its Montreal shops for early delivery.

The Japanese Imperial Railways are reported to have ordered 100 additional locomotives from the North British Locomotive Combination at Glasgow.

The Lake Shore & Michigan Southern is reported to have ordered 60 locomotives, including six heavy switching locomotives, from the American Locomotive Co.

CAR BUILDING.

The Muskogee Traction Company is reported to have ordered six cars from the Boston Electric Co.

The Pittsburg Railways Company is reported to have ordered 100 cars from the St. Louis Car Co.

The Lake Shore & Michigan Southern is reported to have ordered 4,000 steel cars of 100,000 lbs. capacity.

The Philadelphia Rapid Transit is reported to have ordered 30 double motor cars from the General Electric Co.

The Middletown Car Works are reported to have received an order for 500 steel gondola cars for a foreign government.

The Western Steel Car & Foundry Company is reported to have an order for 900 freight cars for the Japanese Government.

The South & Western is reported to have ordered 250 box cars from the Anniston, Ala., plant of the Western Steel Car & Foundry Co.

The Big Bend Coal Mining Co., of Philadelphia, has ordered 150 steel coal cars from the American Car & Foundry Co., to be built in accordance with Pennsylvania Railroad specifications.

The Metropolitan Street Railway, of New York City, is reported to have ordered 75 cars from the J. G. Brill Co. These cars are to be mounted on the J. G. Brill patent Eureka maximum traction trucks.

The Atchison, Topeka & Santa Fe is reported to have ordered 650 steel cars from the Jeffersonville Works of the American Car & Foundry Co. These are the first steel cars to be built at the Jeffersonville Works.

The Baltimore & Ohio has ordered a number of horse express cars of 45,000 lbs. capacity. These cars are to be 9 ft. wide and 6 ft. 10 in. high, inside measurements, and 14 ft. 6 in. high over all, with wooden frames and underframes.

The Baltimore & Ohio, as reported in our issue of May 5, has ordered 1,000 steel gondolas and 1,000 steel hopper cars from the Pressed Steel Car Co., 2,000 all-steel hopper cars from the American Car & Foundry Co., 2,000 all-steel gondolas from the Cambria Steel Co., 1,500 composite gondolas from the Standard Steel Car Co., 2,000 steel underframe box cars, 1,000 from the Western Steel Car & Foundry Co., and 1,000 from the South Baltimore Steel Car & Foundry Co., 250 refrigerator cars from the American Car & Foundry Co., and 250 ballast cars from the Rodger Ballast Car Co., all for 1905 delivery. The 3,000 all-steel gondolas ordered from the McKees Rocks Works of the Pressed Steel Car Co. and the Cambria Steel Co. will be of 100,000 lbs. capacity, and are to measure 40 ft. 6 in. long, 9 ft. 4 in. wide and 4 ft. 2 in. high, inside measurements, and 42 ft. 9 in. long, 10 ft. wide and 8 ft. 9 1/2 in. high, over all. The 3,000 all-steel hopper gondolas ordered from

the American Car & Foundry Co. and the Pressed Steel Car Co. are to be of 100,000 lbs. capacity, and are to measure 31 ft. 6 in. long and 9 ft. 5 in. wide, inside measurements, and 10 ft. wide and 11 ft. 3 1/2 in. high, over all. The 1,500 composite gondolas ordered from the Butler Works of the Standard Steel Car Co. are to be of 10,000 lbs. capacity, and measure 40 ft. long, 8 ft. 5 1/2 in. wide and 3 ft. 4 in. high, inside measurements, and 42 ft. 9 in. long, 10 ft. wide and 8 ft. 2 1/2 in. high, over all, with wooden frames and metal underframes. The 2,000 steel-underframe box cars ordered from the South Baltimore Steel Car & Foundry Co., and the Chicago Works of the Western Steel Car & Foundry Co. will be of 80,000 lbs. capacity, and measure 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, inside measurements, and 9 ft. 10 in. wide and 13 ft. 5 in. high, over all, with wooden frames and metal underframes. The metal underframes for these cars are to be furnished by the Standard Steel Car Co. The 250 refrigerator cars ordered from the American Car & Foundry Co. are to be of 80,000 lbs. capacity and measure 38 ft. 11 1/2 in. long, 8 ft. 3 in. wide and 7 ft. 6 in. high, inside measurements, and 9 ft. 8 1/2 in. wide and 13 ft. 10 1/2 in. high, over all, with wooden frames and underframes. The 250 ballast cars ordered from the Rodger Ballast Car Co. will be of 100,000 lbs. capacity and measure 40 ft. long, 8 ft. 8 in. wide and 7 ft. 11 in. high, inside measurements, and 10 ft. wide over all, with wooden frames and metal underframes. All cars are to have McCord journal boxes and Westinghouse friction draft gear.

BRIDGE BUILDING.

AINSWORTH, NEB.—Bids are wanted June 15 by E. B. Smith, County Clerk, for building a bridge over the Niobrara river in Brown County.

BRAZORIA, TEX.—A contract is reported let to build a bridge, which is to be 1,500 ft. long, including approaches, over the Brazos river, to cost about \$180,000. A number of others are also to be built between Bay City and Algoa.

BROOKLYN, N. Y.—The lowest bidder for building about 15 bridges in connection with the depression of the Manhattan Beach division of the Long Island Railroad was Milliken Bros., whose bid was \$550,000. The work includes the placing of about 10,000 tons of steel. The contract for the concrete abutments for the bridges was awarded recently to See Bros., at \$115,000.

CARTERSVILLE, GA.—The County Commissioners, it is reported, are asking bids June 15 for building a bridge over Etowah river, near Kingston.

CASLEWOOD, S. DAK.—Bids are wanted July 11 by J. A. Meadows, Chairman of the Board of County Commissioners, for building a steel bridge at this place.

CLEVELAND, OHIO.—Bids are wanted June 10 by the Board of Commissioners of Cuyahoga County for building steel bridges and some concrete abutments and culverts. Julius C. Dorn is Clerk.

DAYTON, OHIO.—Bids are wanted June 6 by William F. Miller, Clerk of the Board of Public Service, for building a concrete steel bridge over the Great Miami river at Washington street, to have a length between abutments of 620 ft., with 36-ft. roadway and 9-ft. sidewalks. Louis Haas is President of the Board.

IOLA, KAN.—Bids, it is reported, are being asked by the Commissioners of Allen County June 7 for building four steel bridges.

LANCASTER, PA.—Bids are wanted June 5 by the County Commissioners for building a steel bridge over Octoraro creek. N. D. Schaefer is County Comptroller.

NORFOLK, VA.—Application has been made to the Board of Harbor Commissioners by the Tidewater Railway for permission to build two bridges, one over the southern branch of the Elizabeth river, and the other

over the eastern branch, both to have swing draws, the one over the southern branch having a draw with an opening of 110 ft., and the other having an opening of 140 ft.

ORTIZ, MEX.—A contract is reported let to Bell & Seems, of Mexico City, for building a new steel bridge 1,800 ft. long for the Mexican Central over the river at this place.

PITTSBURG, PA.—A contract is reported let to Friday & Co., of Pittsburg, Pa., at their bid of \$129,152 for building a bridge at Lincoln avenue. (April 28, p. 142.)

PONTIAC, MICH.—Bids are wanted by the City Council June 5 for building seven concrete steel bridges over Clinton river. Joseph H. Thorpe is City Clerk and W. J. Fisher, City Engineer.

RACINE, WIS.—The City Council, at a recent meeting, has authorized the Board of Public Works to advertise for bids for putting up the combined highway and street railroad bridge to carry two tracks over the Koot river at Main street.

ROCKVILLE, IND.—Bids are wanted June 10 by Henry Grubb, County Auditor, for repairing and building cement arch and steel bridges in Parke County.

ST. JOHN, N. B.—The New Brunswick Government will build a bridge over the Metapedia river at a cost of about \$50,000.

TAVISTOCK, ONT.—Bids are wanted by Jas. Anderson, Clerk of township of East Zorra, for building three steel bridges.

VERSAILLES, IND.—Bids are wanted by the County Commissioners June 5 for building a double arch stone bridge in Shelby township. N. Volz is County Auditor.

WASHINGTON, D. C.—The Engineer Commissioner of the District of Columbia has recommended that the bid of the Penn Bridge Company for the construction of the Anacostia bridge across the Eastern Branch of the Potomac River be accepted. The amount of the bid is \$325,500 for a bridge on modified plans, which have been agreed upon by the Engineering Department. The bid of the company on the original specifications was \$339,460, which was more than the appropriation for the bridge. Work on the bridge will begin as soon as the contract is signed.

WILKESBARRE, PA.—Bids are wanted by James M. Norris, County Comptroller, June 5, for building about 36 small steel and stone bridges in Luzerne County.

Other Structures.

BLOOMINGTON, ILL.—The Chicago & Alton, the Cleveland, Cincinnati, Chicago & St. Louis and the Lake Erie & Western are again considering the question of jointly building a union passenger station at a cost of about \$100,000 here.

CHARLESTON, S. C.—Plans for the union passenger station, it is reported, have been approved by the Mayor and a committee appointed to pass upon the same.

CARNSFORD, N. J.—The Central of New Jersey, it is said, is planning to put up a brick passenger station 40 x 70 ft. at this place.

FREEDOM, PA.—The Pennsylvania, it is reported, is planning to put up a passenger station at this place; also one at French Point, one at Economy, and one at Ravenna, Ohio.

McKEES ROCKS, PA.—The Pittsburg & Lake Erie, it is reported, has given to Jones & Laughlin the contract for building the steel portion of its car repair shops at this place, to be approximately 412 x 415 ft. A number of smaller buildings will also be put up.

SILAO, MEX.—The Mexican Central is planning to put up a new passenger station at this place.

SPRINGFIELD, OHIO.—The Cleveland, Cincinnati, Chicago & St. Louis is to build a passenger and a freight station.

TRENTON, N. J.—Plans, it is reported, are

being made by the Pennsylvania for building additional shops at this place, to include a casting shop, storehouse, iron pipe house, storing shop, machine shop and other buildings. When this work is completed, the Panton car shops at Camden are to be abandoned.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALBANY & NORTHERN.—This company, which operates about 35 miles of road northeast from Albany, Ga., has been granted an amendment to its charter to extend its line from that point southwest through Newton, in Baker County to Colquit, in Miller County, a distance of 48 miles.

ARIZONA & COLORADO.—Surveys, it is reported, have been completed by this company for building its proposed road from Durango, Colo., to a junction with the Southern Pacific, either at Lordsburg, N. Mex., or at Cochise, Ariz., and work is to be begun within three months. It is probable that the latter place will be selected as the terminus. The road will be about 400 miles long, passing through valuable coal lands in Western Sorocco and Velanca Counties.

ATCHISON, TOPEKA & SANTA FE.—A contract is reported let to the Lantry-Sharpe Contracting Co., of Kansas City, for building the Belen cut-off in New Mexico. The estimated cost of the work is about \$6,435,000. (April 21, p. 130.)

CANADIAN VALLEY & WESTERN.—This company has filed maps at Muskogee showing the proposed route of its road to be built from Lehigh, Ind. T., to Chickasha through the towns of Stonewall, Byars and Purcell, about 125 miles. The contract has been let to the Canadian Valley Construction Co. Sub-contracts will be let for 20-mile sections, and work is to be begun at once. Connection will be made with the Missouri, Oklahoma & Gulf, 16 miles west of Lehigh for Muskogee. Dorsett Carter, of Purcell, is President. (See Construction Record.)

CANTON & YOUNGSTOWN (ELECTRIC).—This company, which was organized last year to build an electric railroad from Canton to Youngstown, has applied to the latter city for rights of way and expects to begin the building of the road at once. The officers are: William H. Clark, President; J. R. Snyder, Vice-President; L. D. Blanchard, Secretary, and C. H. Schlabach, Treasurer, all of Canton, Ohio. (See Construction Record.)

COAL RIVER.—This road, which has been built as a branch of the Chesapeake & Ohio from St. Albans, W. Va., to Holly, is to be at once extended through Logan and Boone Counties for a distance of 45 miles to a point beyond Madison, passing through a rich coal and timber territory.

COLORADO, TEXAS & MEXICO.—This company, which is building a road from Abilene, Tex., has amended its charter so that it can build from a point on the Red river in Wilbarger County, Tex., southward through Hardeman, Wilbarger, Foard, Baylor, Knox, Haskell, Jones, Taylor, Runnels, Coleman, Concho, McCulloch, Mason, San Saba, Llano, Gillespie, Kerr and Kendall Counties, to connect with the San Antonio & Aransas Pass at or near Comfort, approximately 400 miles. J. H. Paramoe, C. W. Merchant, C. S. Bass, R. G. Anderson, Fred Cockrell, and others are directors. Morris R. Locke is President. (See Construction Record.)

DELAWARE, LACKAWANNA & WESTERN.—This company is reported to be planning an extension of its Cincinnati branch from Cincinnati through McDonough and Preston to a connection with its Utica line at Norwich, a distance of 20 miles. It is said that work on this extension is to be begun at once.

EDMONDS & EASTERN.—This company has been incorporated in the state of Washington to build a railroad from a point near Edmonds, in Snohomish County, to Monroe,

also a branch from Monroe through Snoqualmie Valley, a distance of 60 miles. H. J. Hughes, F. M. Stanley and others, of Seattle, Wash., are interested.

GREENVILLE & NEWNAN.—A charter has been granted in Georgia to this company for building a road from Greenville, in Meriwether County, to Newnan, in Coweta County, about 25 miles. This is supposed to be a project of the Central of Georgia. (April 28, p. 142.)

GRESORIA RAILROAD.—According to reports, the Dwight-Furniss Co., of Guanajuato, Mexico, has bought this road and will extend it for a considerable distance. The new owners have also changed the proposed route from Gonzales station, on the National, to Irapuato. The part of the line already completed to the mines of San Gregorio will be operated as a mineral road, and the main line will be operated from Marfil to Irapuato. Ignacio Ibarguengoitia, of Guanajuato, is President.

GULF COAST LINE.—A contract is reported let by this company to Johnson Bros. for building its line from a point near Alvin, Tex., into Galveston. Jeff N. Miller is Vice-President and General Manager.

HALIFAX & SOUTHWESTERN.—This company, which is controlled by the Mackenzie & Mann interests, of Toronto, Ont., and which now operates about 195 miles of road, will build during the present year about 80 miles additional. J. Brignell, of Bridgewater, N. S., is Superintendent.

KEEWEENAW CENTRAL.—See Railroad Corporation News.

LIBERTY-WHITE.—This company, which operates a road at Liberty, Miss., has recently had its charter amended to allow it to build to Columbia, in Marion County. About 12 miles of this extension is now under construction. W. M. White, McComb, Miss., is General Manager.

LONG ISLAND.—Work has been begun by this company for the improvement of its road in the borough of Brooklyn, N. Y., which includes the rebuilding of the Bay Ridge and Manhattan Beach Railroad at a cost of about \$7,000,000, and the abolishment of a large number of grade crossings. (April 14, p. 121.)

LONOKO, PINE BLUFF & SOUTHWESTERN.—This company has been granted a charter to build its proposed road from Lonoke, Ark., to Pine Bluff, about 45 miles. The incorporators include: J. P. White, T. M. Fletcher and David Gates, of Roanoke, and M. J. Craig, of New York.

MADISON & GOODLETTSVILLE.—A charter has been granted this company in Tennessee to build a railroad from a point near Madison, in Davidson County, on the main line of the Louisville & Nashville, north to a point near Goodlettsville, about six miles. The incorporators include: John Geddes, J. B. Keeble, E. B. Duval, R. S. Willock and John W. Judd.

MARQUETTE & SOUTHEASTERN.—An officer writes that this company has given a contract to McDonell Bros. & Co., of Grand Rapids, Mich., to build an extension of its main line northwest from Marquette to Lake Independence, a distance of 25 miles. Work is under way, and will be completed about November 1. The maximum grade is 1 per cent., and the maximum curve 3 degrees. There will be no steel bridges or important trestles. (May 19, p. 167.)

MEXICAN CENTRAL.—This company, it is reported, has under consideration a plan to build a direct line from Guadalajara to Aguas Calientes, for which surveys were made several years ago.

MEXICAN ROADS.—Application, it is reported, has been made by John Alexander Dowie, of Chicago, Ill., who is planning to found a new Zion City near Victoria, for a concession to build a railroad from Victoria to Matamoras, a distance of about 200 miles.

Preliminary surveys are being made for a road to be built from Sierra Mojada, the present terminus of the Mexican Northern, to Cuatro Cienegas, the terminus of the Mexican International. Victor Ginther, of Santa Rosalia, is interested in this project.

The Compania Mexicana Cacahuamilpa, which was organized last year in the City of Mexico, with a capital of \$400,000, it is reported, will build a railroad from Cacahuamilpa to Hermosa, on a division of the Mexican Central. Carlos Bach is President.

MORGANFIELD & ATLANTIC.—Incorporation has been asked by this company in Kentucky to build a railroad from Morganfield, Ky., to Providence, about 25 miles, where connection will be made with the Louisville & Nashville. Surveys are now in progress. T. B. Young is President, A. W. Mason, Vice-President, and J. R. Nall Secretary.

NAVY COVE HARBOR & RAILROAD COMPANY.—This company has been incorporated in Alabama to build a railroad from Foleyton Station to deep water at Fort Morgan, Ala. Connection will be made with the Bay Minette & Fort Morgan branch of the Louisville & Nashville. The incorporators include: Charles Barclay, T. C. Hand, W. C. Dinwiddie and others.

NEVADA NORTHERN.—A contract, it is reported, has been let by this company for building a line from Toano, Nev., on the main line of the Southern Pacific, south to Copper Flat, in White Pine County, about 140 miles. Rights of way have been granted by the commissioners of White Pine County and contracts are being let for grading. The road will pass through a rich mineral territory.

NEW ORLEANS & GREAT NORTHERN.—It is reported that work is about to be begun on an extension of this road from Slidell, La., north of Florencia, nine miles, by H. J. Bonnabel, the contractor.

OKLAHOMA TRACTION.—This company has been incorporated with a capital of \$300,000 in Oklahoma City, Okla. T., to build an electric railroad about 40 miles long connecting Oklahoma City, Capitol Hill and Lexington. The incorporators include: C. V. Eggleston and S. C. Glasgow, of Oklahoma City; C. R. Eggleston, of Fort Smith, Ark.; D. L. Woodson, of Alva, and L. E. Patterson, of Ada, Ind. T.

PARIS, DEPOT & SOUTHEASTERN.—The stockholders of this company, which has a capital of \$100,000, adopted the above name under which incorporation will be asked in Texas to build a railroad from Paris to Rosalie, in Red River County. R. F. Scott is President; Geo. I. Terrell, First Vice-President; J. G. Wright, Second Vice-President; W. H. Grayson, Third Vice-President; C. I. Broad, Treasurer, and J. J. Dickerson, Secretary.

PHILADELPHIA & READING.—President Geo. F. Baer, of this company, is quoted as saying that the company is ready to elevate its tracks in Ninth street, Philadelphia, and that the company will pay \$2,000,000 towards the cost; also that after the tracks are elevated electricity may be used as a motive power for local trains.

PHILADELPHIA & WESTERN.—Announcement has been made by W. T. Van Brunt, President of this road, that work will be begun at once at several points along the proposed line from 63d and Market streets, Philadelphia, to Wayne. It is proposed to have 12 miles of the road in operation by the first of October. Construction work will be pushed until the line is completed to Parkesburg. (May 12, p. 159.)

PORT ARTHUR & HOUSTON SHORT LINE.—A franchise has been granted to this road by Jefferson County Commissioners to build terminals at Port Arthur, Texas, on condition that the road shall be built within one year.

RED BLUFF & FALL RIVER.—Articles of incorporation will be filed by this company in

California for building a road to run from Red Bluff for a distance of 40 miles, passing through the towns of Manton and Shingletown, a rich timber territory. Surveys for nearly the entire distance have been completed. D. E. Miles and other capitalists of Red Bluff are interested.

ROCHESTER & SOUTHERN ELECTRIC.—Under this name a company will ask for incorporation in New York to build an electric railroad from Rochester southeast to Elmira, a distance of about 120 miles, with several branch lines. George A. Engert, of New York, represents the company at Rochester. When incorporation has been granted, a company known as the Rochester & Southern Construction Company is to be incorporated, with a capital of \$100,000, to build the road. The necessary right of way for about 90 per cent. of the way has been obtained. The incorporators of the company will probably include: Walter B. Duffy, Benjamin E. Chase, Stephen C. Hollister, William A. Sutherland and others, of Rochester; William W. Clark, County Judge of Steuben County; O. F. Lieders, of Wayland; J. M. Edwards, of Danville, and George A. Engert, of New York.

ST. LOUIS & NORTH ARKANSAS (ST. LOUIS & SAN FRANCISCO).—Plans are nearing completion for the building by this company of an extension from Leslie, Ark., south to Little Rock, a distance of about 78 miles through a section at present without railroads, connection being made with the Rock Island extension from Traskwood to Crossett. Negotiations are under way to acquire the rights of the old St. Louis, Little Rock & Gulf. (See Construction Record.)

ST. LOUIS, BROWNSVILLE & MEXICO.—A contract, it is reported, has been given by this company for building 100 miles of its proposed extension under a concession granted over a year ago from Brownsville, Tex., to Tampico, Mex. (See Construction Record.)

This company, it is reported, will build a road from Calvin, Tex., to Corpus Christi, 16 miles.

SAVANNAH RIVER.—Application has been made for a charter for this company with a capital of \$100,000 to build a steam road from Augusta, Ga., south to Clyo, in Effingham County, where connection will be made with the Seaboard Air Line, a distance of about 90 miles.

SHELBYVILLE & OHIO RIVER (ELECTRIC).—An officer writes that the roadbed of this proposed road from Shelbyville, Ky., to a point opposite Madisonville, Ind., has been completed for 12 miles, but no track has been laid. Contracts for the rest of the work will be let in about 30 days, and work is to be begun shortly after. The maximum grade will be 2½ per cent. There will be no important bridges or trestles. Luther H. Leber, of Eminence, Ky., controls the road.

SOUTHERN.—Announcement has been made that the Southern will complete its double track from Charleston to Summerville, 22 miles. The double track now extends as far as the eight or ten-mile junction. Engineers are at work grading the road for the extension. The construction of the new track is designed to meet the competition of the electric road, which is now being graded and is soon to be put in operation.

TACOMA EASTERN.—This company, which operates a line about 55 miles long in the state of Washington, is building an extension 10 miles into Lewis County into a rich timber section. The work includes the building of a bridge over the Nisqually, three miles east of Elbe, of a total length with approaches of about 1,300 ft.

UNION PACIFIC.—An agreement, it is reported, has been reached by this company, and the Northern Pacific to jointly build a railroad into the Clearwater district, Idaho. The road will traverse a distance of between 300 and 500 miles, through an undeveloped section. This project has been a subject of dispute between these two companies for a number of years.

WILLIMANTIC TRACTION.—The Legislature of Connecticut has recently authorized this company to increase its stock and to build a street railway from South Coventry to Manchester, nine miles, where connection will be made with the Hartford, Manchester & Rockville, making a continuous electric road between Willimantic and Hartford, about 27 miles.

WISCONSIN & MICHIGAN.—Notice has been sent to the stockholders calling a meeting June 12 for the purpose of increasing the capital stock. At this meeting, it is proposed to provide for the extension of the road from Iron Mountain to Norway and to Superior, a distance of about 160 miles.

WYOMING ROADS.—Plans are being made by G. L. McFarlane and F. E. McClure, who represent a number of Pittsburgh capitalists, to build a railroad from Sheridan, Wyo., to Buffalo, a distance of about 50 miles.

RAILROAD CORPORATION NEWS.

ALLEGHENY & SLATINGTON (ELECTRIC).—The foreclosure sale of this property for default of interest on bonds has been ordered for June 19, at a minimum price of \$275,000.

ATLANTA & BIRMINGHAM (SEABOARD AIR LINE).—Plympton, Gardiner & Co., of New York and Chicago, are offering at 95½ \$500,000 of this company's 4 per cent. first mortgage bonds. These bonds are a first lien on 208 miles of main line. The Atlanta & Birmingham is the Seaboard Air Line's Birmingham connection.

BUFFALO, ROCHESTER & PITTSBURG.—The New York Stock Exchange has listed \$1,500,000 additional common stock. This makes the total listed \$10,500,000.

CHESAPEAKE & OHIO.—Sailer & Stevenson, of Philadelphia, are offering, at a price to yield 4.3 per cent., part of an issue of \$1,800,000 of this company's 4 per cent. gold equipment trust certificates, series G, dated April 1, and maturing on April 1, 1915. These equipment certificates cover 18 locomotives and 1,500 cars.

See Coal River below.

CHICAGO GREAT WESTERN.—Of the \$1,738,709 additional common stock which has just been listed by the New York Stock Exchange, \$1,163,400 was issued to buy the same amount of new stock of the Wisconsin, Minnesota & Pacific. The additional \$575,300 was issued to buy a similar amount of new stock of the Mason City & Fort Dodge. By this issue the Chicago Great Western now owns all the capital stock of both these subsidiary companies. The total amount of Chicago Great Western stock now listed is \$44,464,545.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—It has been decided to allow the preferred stockholders as well as the common stockholders to subscribe for the new stock, which is to be issued at par to increase the common stock from \$28,700,000 to \$40,000,000.

COAL RIVER.—Rudolph Kleybolte & Co. are offering at 98 \$500,000 of this company's first mortgage 4 per cent. gold bonds. These bonds are guaranteed by the Chesapeake & Ohio, and are part of an issue of \$600,000 (\$3,000,000 authorized) made to reimburse the Chesapeake & Ohio for the purchase of the lines of the Coal River Railway, comprising about 22 miles of completed line, which was built under the name of the Coal River & Western. Additional bonds to the amount of \$900,000 are to be issued to build 45 miles more. An annual sinking fund is to go into operation in November, 1910, amounting to 1 per cent. of the bonds then outstanding, to be used in purchasing these bonds at a price not exceeding par and interest, or, if they cannot be purchased at that price, for investment in other securities, preferably Chesapeake & Ohio bonds. The Coal River runs from St. Albans, W. Va., on the Chesapeake & Ohio, to Holly, 22 miles. It is to

be extended through Locust and Boone Counties to a point beyond Madison, 45 miles, running through a section rich in coal and timber.

HUDSON VALLEY (ELECTRIC).—J. P. O'Brien, of Troy, has been appointed receiver of the Hudson Valley Railway Co. on application of a bondholder. A referee has also been appointed to sell the road after it has been advertised for six weeks. This action comes as the result of the failure of the Merchants' Trust Co., of New York, which was heavily interested in the securities of the road. The Hudson Valley runs from Albany and Troy north to Warrensburg, with a branch from Mechanicville to Saratoga Springs. It owns 119 miles of road, and has trackage rights over 23 miles more.

KEEWEENAW CENTRAL.—The Lac La Belle & Calumet, a narrow-gage road, 7½ miles long, in Michigan, has filed a certificate changing its name to the Keeeenaw Central, and increasing its capital stock from \$150,000 to \$1,000,000, of which \$500,000 has been issued. It is planned to build this year 32 miles of standard gage line, making the road extend from Calumet, Mich., to Lac La Belle. C. A. Wright, Hancock, Mich., is President, and James H. Bailey, 45 Broadway, New York, Secretary and Treasurer.

LAKE SUPERIOR & SOUTHEASTERN.—This company, which has been organized to enable the Wisconsin Central to build a line from Duluth, Minn., southeast to Ladysmith, Wis., on the Wisconsin Central, 115 miles, has made a mortgage to secure \$6,000,000 20-year 5 per cent. bonds.

LEHIGH VALLEY.—Application has been made to the New York Stock Exchange to list \$20,100,000 general consolidated mortgage bonds of 2003.

NEW YORK, ONTARIO & WESTERN.—President Mellen, of the New York, New Haven & Hartford, has announced that the New York, Ontario & Western will begin the payment of dividends this month. The rate is not announced.

OHIO TRACTION.—This company has recently been incorporated in Ohio as a holding company for several electric railroads in that state. It has \$20,000,000 authorized capital stock, \$10,000,000 of which is 5 per cent. cumulative preferred and \$10,000,000 common stock. It holds the entire capital stock of the Cincinnati Traction, Cincinnati Interurban, Cincinnati Zoological Co., and Cincinnati Car Co. It also holds one-half the stock of the Traction Terminal Co. and a large interest in both classes of stock of the Cincinnati, Dayton & Toledo Traction. These companies operate about 335 miles of line in and about the city of Cincinnati, including a line from that place to Dayton.

PENNSYLVANIA.—The New York Stock Exchange has been asked to list \$1,106,650 additional stock. This will make the total listed \$302,711,950.

SOUTH & WESTERN.—It has been announced by J. M. Barr, President of the Seaboard Air Line, that Messrs. Thos. F. Ryan, Jas. A. Blair, T. J. Coolidge, Jr., N. B. Ream and John B. Dennis have bought the Clinchfield Corporation, which owns the South & Western and the Crane's Nest coal fields. The Seaboard Air Line has, as yet, no connection with this purchase, although the men named are all directors of that road.

TOLEDO & WESTERN (ELECTRIC).—On June 24 the stockholders will vote on authorizing an increase of the capital stock from \$1,800,000 to \$2,500,000, and on issuing \$2,500,000 25-year 5 per cent. gold bonds. The company owns 81 miles of track, from Toledo, Ohio, to Fayette and Pioneer, with a branch to Adrian, Mich., the majority of which is built on private right of way. It carries both freight and passengers.

WHEELING & LAKE ERIE.—The stockholders have authorized the proposed mortgage securing \$50,000,000 bonds.

